FINGER LAKES
Vineyard Notes
Cornell University
Cooperative Extension
Finger Lakes Grape Program

Grower/Winery Relationships

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There's an old joke in the vineyard world that goes something like this:

Question: "What's the biggest pest in the vineyard?"

Answer: "A winemaker."

While it's somewhat tongue in cheek, there is sometimes a hint of truth in it as well. In many cases (not all, certainly), the only communications that a grower has with a winery and winemaker purchasing his or her fruit are when they agree on how many tons of which varieties will be purchased, and just before harvest when deciding on when to pick the fruit. In some cases, winemakers will require that growers implement practices that have little to do with the quality of the crop, like extra crop thinning because they read reviews from wine critics who are convinced that low yields always improve quality, or restricting certain spray materials at a random point in the season based not on not much more than a gut feeling.

This is not to say that growers are completely innocent of the charge of being an occasional thorn in a winemaker's side, however. There are certainly things that growers do from their end that frustrate winemakers too (e.g., "What do you mean you can't take these extra 4 tons of grapes I put on the truck without telling you about it?").

All of this is to say that, as we approach the beginning of another harvest, both growers and winemakers need to take responsibility for their business relationship so that both parties better understand each other and benefit from that relationship. Here are just a few suggestions of ways to help make that relationship work better.

- Meet out in the vineyard during the season. The week before harvest should not be the first time that a winemaker steps into a vineyard that he or she is buying fruit from. Mid-season discussions can help to deal with potential issues before the stress and chaos of harvest sets in. Discuss ways to manage a particularly vigorous block, like carrying a higher crop load will keep the vines in

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better balance and actually produce better fruit in the end. Or the vineyard near the wooded edge where pest pressures are heavier in some years, and what the expectations are regarding sprays closer to harvest in order to keep the fruit in good condition.

- Be open to each others' questions and concerns. Winemakers focus on making wine, and growers focus on growing the grapes, so it's hard for a winemaker to know the ins and outs of grape growing, and vice versa. Helping each other to understand what is really important in order to meet your goals is critically important, so spend a little time giving, and receiving, a little education.

- Growers: Be the winery's best supplier. In the end, the grower is a supplier for the winery, just like those that sell bottles, corks, labels, etc. As a grower, think about what makes you prefer a particular supplier over another – good communication, a reliable product, timely delivery of exactly what you expected. At some point, if you can't deliver what they want, they'll find it somewhere else.

- Spell out each party's needs and expectations before harvest kicks in. Each party has needs and expectations as part of a business relationship – be sure to find out what those are. Take the time to listen to questions, and have conversations about how you can help to address any issues they might have. It's probably helpful to write those down ahead of time.

Hey, that last one sounds like a…contract.

Bingo.

A Word on Contracts

Many growers and wineries, particularly in the East, rely on 'handshake' agreements when it comes to grape purchases. While they can certainly work, having a written understanding of what is expected of each other – a contract – can be valuable, especially when it comes to clarifying issues like tonnage, price, quality parameters, payment schedules, etc., all of which I have heard disputes arise over during and after harvest. Having a contract does not mean the two parties are in an adversarial relationship, nor does it mean that there is no flexibility regarding the contract's terms should something need to change. Contracts allow both growers and wineries to decide on and spell out their business relationship, making sure that both of their needs are met.

Keep the pest management efforts focused on things like powdery mildew and grape berry moth. The winemaker (or the grape grower) should be a partner, not another pest you have to manage.

Resources about winery/grower contracts:

Lake, C. *Contracts Between Wineries & Growers*. September 7, 2012. http://www.extension.org/pages/62146/contracts-between-wineries-and-growers#.U5YfAy_Uty9

Blake, C. *8 Keys to a Better Wine Grape Grower Contract.* Western Farm Press, May 22, 2013. http://westernfarmpress.com/orchard-crops/8-keys-better-wine-grape-grower-contract

Zoecklein, B. *Sample Harvest Contract.* http://www.apps.fst.vt.edu/extension/enology/extonline/harvest.html.

Be sure to consult your own legal representative before entering into any contractual obligations.

This article was originally published in the July 2014 issue of American Fruit Grower.

Tools for Crop Estimations

Luke Haggerty and Dr. Terry Bates

Crop estimation is a vital tool for all grape growers to assist in making predictions of potential yields before harvest. Estimating potential crop allows growers to let their buyers know how much fruit to expect, provides time to adjust crop load to meet quality targets, and will dictate how the vineyard is managed the remainder of the growing season. For many Concord growers crop estimation has become a common practice to help make decisions on the order their vineyard blocks are harvested. This article will summarize Concord phenology data, 2014 crop estimations for the nine-site study, and address how to use the crop estimation chart based on Concord berry weight.

The Lake Erie Grape Region had a benchmark year in 2013 with most growers harvesting more grapes than they ever had before. Contributing to this year's bud fruitfulness, 2013 was also a good growing season. Floret and berry counts by Kelly Link on the standard phenology vines at CLEREL and Fredonia indicate slightly above average floret counts, but slightly below average percent berry set (Table 1) resulting in a crop that should be close to slightly below average. However, as a result of adequate heat and water the fresh berry weight 20-30 days after bloom (Figure 1) is showing 19% larger berries than the 15-year average.

Location	Stock	Pruning	Historical Berries/Cluster	2014 Berries/Cluster	Historical % Set	2014 % Set
Fredonia	Own	Balanced 30+10	42	40	35	36
Fredonia	C3309	Balanced 20+20	37	31	37	35
Protalnd	Own	Balanced 20+20	30	36	33	35
Protalnd	Own	90 Nodes		33		26
Protalnd	Own	120 Nodes	34	31	34	37
Protalnd	Own	Minimal		36		30
Mean			36	35	35	33

Table 1. Concord Berries/ Cluster and % Set.

Thirty-day berry weight on the "standard" vines at CLEREL averaged 1.66 g. Assuming we are at 50% of final, this would put final berry weight at 3.32g. 2014 is tracking close to 2001 where 1.75 g at 30 days turned into 3.4g at harvest (Figure 1).

Therefore, it is reasonable to assume that 50% at 30 days is still a practical estimation for 2014. In most cases, growers probably have more hanging in the vineyard than what you may have first thought based on last year's yield and the cold winter.

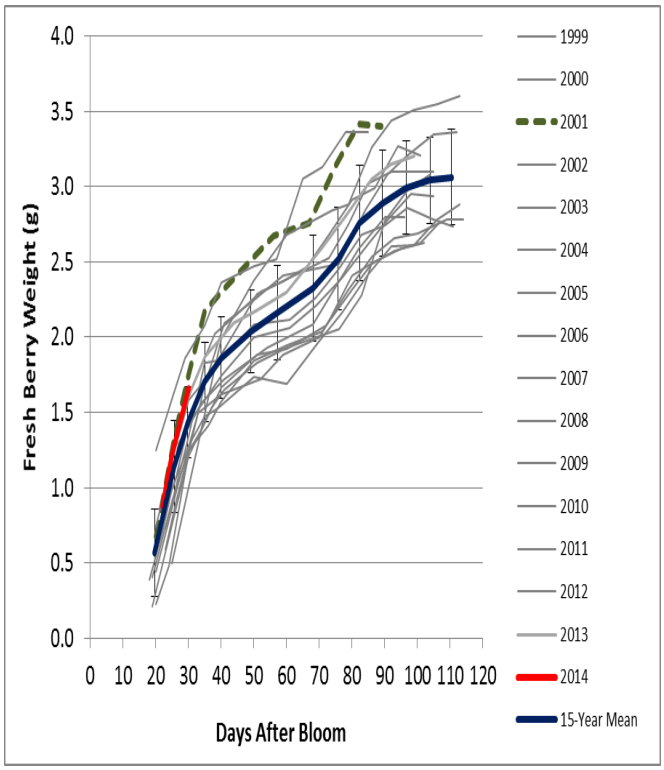


Figure 1. 2014 and mean Concord fresh berry weight.

Across the nine-site study, we have seen some large numbers with respect to berry weight and predicted final harvest weights on individual samples. After crunching through the averages, however, the data and predictions look more reasonable – reinforcing the need to increase sample numbers to achieve higher confidence in the crop prediction. Across all sites, increasing retained nodes increased yield prediction and decreased berry weight as we would expect. Individual samples across the nine sites ranged from 5 to 15 tons/acre predicted yield. Regardless of your thoughts on fruit thinning, we strongly suggest you follow the crop estimation procedure.

Mean Berry Weight and Predicted Yield for the Nine-Site Study		
Pruning Level	Predicted final berry weight (g)	Predicted harvest weight (tons/acre)
60 Nodes/Vine	3.6	8.9
90 Nodes/Vine	3.4	10.1
120 Nodes/Vine	3.2	12

Table 2. 2014 nine-site study pruning level and corresponding predicted final berry weight (g) and predicted harvest (tons/acre) for Concord.

Steps for using the Concord Crop Estimation Chart

The "Crop Estimation Chart" referred to in these steps can be found on the last page of the article or at http://lergp.cce.cornell.edu/submission.php?id=65

Bloom date and days after bloom:

This system is based on bloom date, and in order to be accurate you need to know when your grapes were at 50% bloom. In Fredonia, 50% bloom occurred on June 15th; one day after the 50 year average of June 14th. Count off starting at your bloom date and accrue the respectable days-after-bloom (DAB). On the chart the DAB is found in the shaded "Time of Season" and not to be confused with "% of Final Berry Weight" directly below.

Row Spacing:

Like bloom date, you need to know your vine spacing. Row spacing determines the length of a row that will equal 1/100th of an acre. The wider the row you have, the shorter the sampling length will be. For example, sampling a block with a 10' row you will need to clean pick 45.9 feet. If your rows are at 7.5' spacing, you need to clean pick 58.1 feet. If you have 9-foot row spacing and your panels are at 24 feet then this should be easy. However, it is best to determine your row spacing and cut a length of rope to guide your sampling lengths rather than rely on post lengths that have been changed out over the years.

Length of rope used to guide harvester on distance of sample (determined by row width).

Sampling:

Once the row spacing and sample distance is calculated, clean pick and weigh the samples. The more samples you take, the better your prediction will be. It also helps to take samples from areas of known variation across the vineyard. For example, take 2-3 samples from high vigor, medium vigor, and low vigor sections of the vineyard and apply your predictions appropriately to those sections. If you are using a harvester to clean pick panels walk behind afterwards to assess how many grapes are still on the vine/or that are on the ground.

Using the Chart:

Once you have the sample, the chart does the rest of the work for you. Follow the corresponding DAB down and the respective weight over and you have the estimated tons/acre at harvest. For example, let's say it's July 25th or 40 DAB (bloom on June 15th) and the average from 4 samples weighs 100 pounds. I would have an estimated 8.3 tons/acre potential crop.

Things to keep in mind:

- If you have an accurate bloom date for your vineyard, follow the crop estimation chart to predict final harvest weight. If you're not and you are using the actual berry weight samples to come up with your multiplication factor, be reasonable in what you think your final berry weight will be. A final berry weight of 3.4g for 2014 is a reasonable start for this wet season. Some vineyards tend to have smaller average weights and some tend to be larger – and you should be starting to get an idea where your vineyard fits. Be reasonable – it is unlikely (highly unlikely) that your Concord vineyard will average 4.0g berries at harvest even if your 30 DAB weight was 2.0 g.
- Getting it right is important. Underestimating crop potential can lead to delayed harvest waiting for the grapes to ripen and the BRIX to rise. Overestimating a crop load may result in unwanted thinning or unnecessary expensive chemicals being used to care for a crop that is not there.

Managing Grape Berry Moth:
From calendar-based sprays to degree day models

Tim Weigle,, NYSIPM, LERGP Team Leader

Grape berry moth (GBM) has long been the focus of research projects and extension programs. I have been working with grape berry moth since 1989, when I started in my current position. A written overview of grape berry moth can be found in Grapes 101 Grape Berry Moth Management in the April 2011 issue of Appellation Cornell at http://grapesandwine.cals.cornell.edu/appellation-cornell/issue-6/grapes-101-gbm.cfm

With the introduction of the new GBM phenology-based DD model on NEWA it struck me that we have come a long way since 1989 where 2 to 3 insecticide applications were routinely made in Lake Erie vineyards each year. For those new to grape growing in the region or for those who like history, a bit of background in our battle against grape berry moth is in order. In the late 1980's, then grad student Chris Hoffmann and his advisor Dr. Tim Dennehy, Department of Entomology, NYSAES, Geneva developed the Grape Berry Moth Risk Assessment (GBM RA) protocol - http://ecommons.cornell.edu/bitstream/1813/5202/1/FLS-138.pdf . The protocol used the history of GBM damage, amount of snow cover and surrounding topography (wooded edges in particular) as a way to assign a risk category for the potential of economic damage from grape berry moth to each specific vineyard block.

The first GBM RA protocol implementation project started in 1990 with growers in the Lake Erie and Finger Lakes regions. After three years, this project helped to identify over 50% of the vineyards in the Lake Erie region that fell into the low risk category. These vineyards were able to reduce insecticide use over multiple years. This was down from a typical three insecticide program based on both phenology and calendar with sprays being applied at immediate prebloom, immediate postbloom and the last applied in the first week of August. Up to 1989, the timing of insecticides and fungicides were married to each other. This resulted in the timing not being perfect for the management of either disease or insect. The GBM risk assessment protocol was instrumental in assisting growers in determining the need to spray, as well as, the timing. Simultaneous research and implementation projects on disease management of powdery mildew, black rot, Phomopsis and downy mildew by Dr. Roger Pearson and others in the Department of Plant Pathology, NYSAES, Geneva and members of regional grape extension programs helped growers to understand the need to more accurately time their pesticide applications. Not only was there an overall reduction in insecticide use but some of those applications were made as spot treatments to only the edges of vineyards, equating to further reductions in insecticide use.

The GBM RA protocol worked well until the late 90's and early 2000's when there was a number of warmer than usual growing seasons combined with warmer than usual dormant seasons. This combination provided conditions that aided overwintering survivability (more GBM to start the season) as well as more heat units during the growing season to create more generations of GBM (the more heat units, the faster an insect moves through its development). In 1989, 2 - 3 generations per year was typical depending on how warm the growing season was. Three generations per year is now common and even a partial or full 4th generations on a more regular basis. Needless to say, the spray timings that were developed for 2 - 3 generations did not function well when a 4th generation occurred. This has led to more late season damage such as direct feeding on the berries, often leading to rejection at the processor in juice grapes. For winegrapes, GBM feeding by the larvae provides an entry wound, increasing susceptibility to botrytis and sour rot. This results in grapes being lost in the field or rejected by the winemaker.

In response to these problems, work done by a host of people – Saunders, Timer, Tobin and Muza from Penn State; Loeb, Hesler and Weigle from Cornell

and Rufus Isaacs from Michigan State has resulted in a new Phenology-based, degree day model for predicting GBM development. The model uses wild grape bloom as the biofix to start accumulating Growing Degree Days to more accurately time insecticide applications against GBM. Saunders et.al. found that it takes 810 degree days (base temp 47.14 F) for GBM to go through a complete generation from egg to egg-laying. This information has been combined with the risk assessment and scouting protocols of the GBM risk assessment protocol. Research and extension staff have worked with the Network for Environment and Weather Applications (NEWA) to place this model on their website http://newa.cornell.edu/ to assist growers in accessing the best information to use in timing of scouting, and insecticide applications, for GBM. The research portion of developing this model has just been finished and the implementation phase is just starting with the release of the model for growers to use on a large scale in their vineyard operations. While the model worked well in small block research trials it still needs to be tested on a large scale as part of grower's vineyard IPM strategy. As more growers use the model and provide feedback on what works, and what doesn't, the model will be revised and improved in the years to come.

Since we are still in the infancy of using the new GBM DD model there have been questions and concerns raised over how best to use the model. The Network for Environment and Weather Applications (NEWA) http://newa.cornell.edu/ has made accessing the model information very easy though their web pages.

Accessing the GBM DD model on NEWA

There are two simple ways of getting to the new grape berry moth model after getting to the web site. Follow the steps below.

Access the NEWA Home Page at: http://newa.cornell.edu/

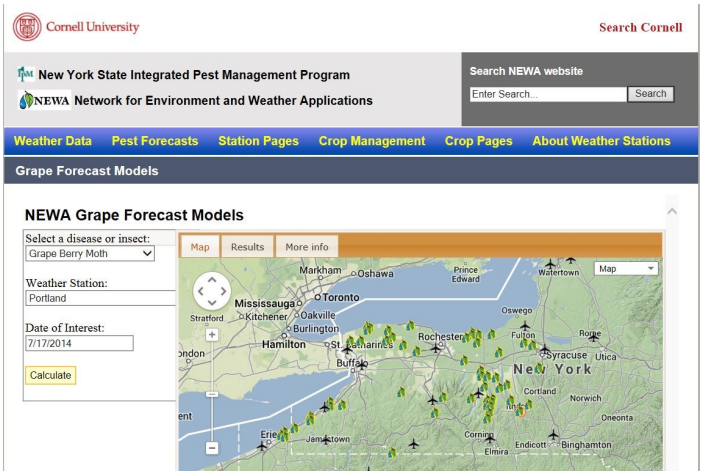
On the NEWA Home page do one of the following:

1. Using the pull down menu under Pest Forecasts in the blue ribbon bar at the top of the page, choose grape forecast models OR

2. Click Station Pages in the blue bar at the top of the page OR

3. Using the map on the home page click on the station location you want weather info from.

Using option 1. Pest Forecast models, will bring you to the following page (figure 1)

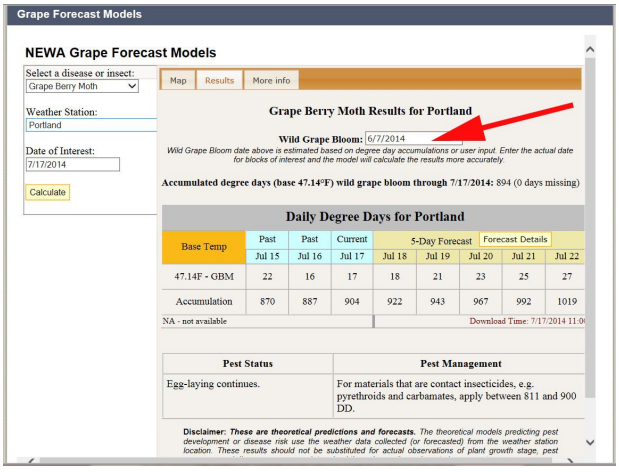


On the left hand side of the page there is a pull down menu to use in selecting a disease or insect. Click on the pull down menu and select **grape berry moth.**

Using the weather station pull down menu select the station you would like model information from.

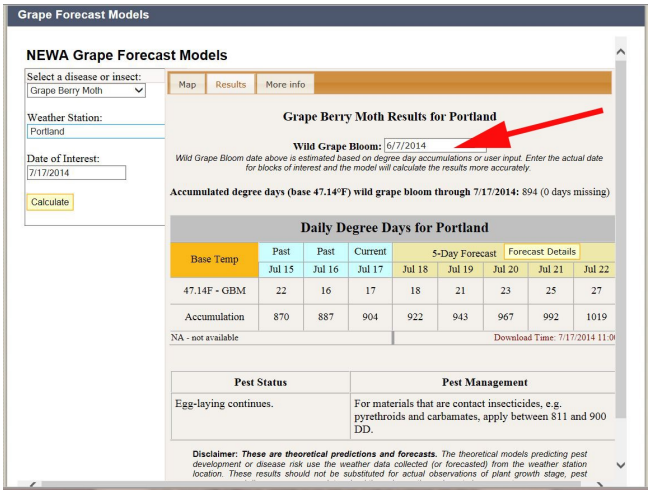
Finally, select the date you are interested in. Typically you would type in the current date.

Hit calculate. A new screen will appear (Figure 2) which provides Degree Day accumulation



calculated using the model at a base temperature of 47.14 F.

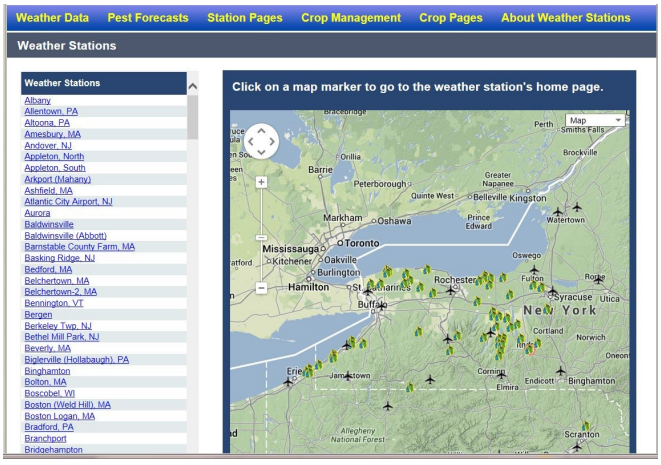
IMPORTANT: Wild grape bloom is used as the biofix (start date) for accumulation of degree days using this model. It is very important that you check your various vineyard blocks and note when wild grape bloom occurred AND put in the correct date using the box on the results page (Figure 2).



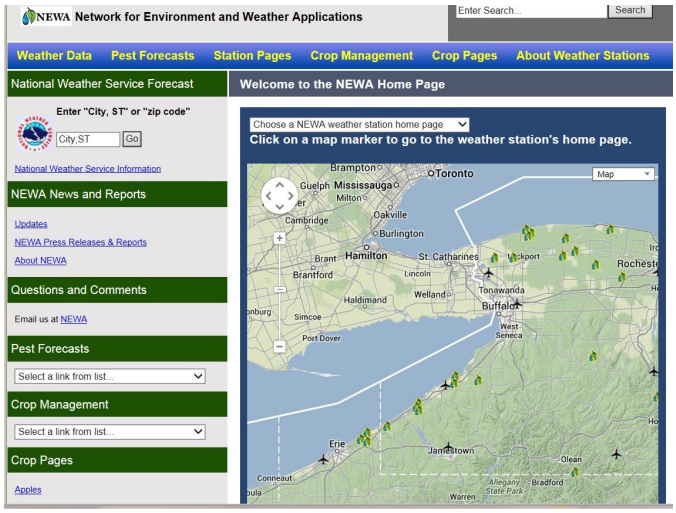
Clicking on the date will bring up a calendar that can be used to change the date or you can make changes directly to the date using your keyboard.

The other two options will get you to the same place, same results, just using different paths.

Option 2: Click Station Page in Blue Ribbon at Top of home page. This will take you to a page with a listing of stations on the left side of the page and a map of station locations on the right (Figure 3).



This is pretty straightforward. By clicking on a station listed on the left you will go to that stations page (Figure 4). Or you can get to the station page by clicking on the station location on the map.



On the Stations page, choose the Grape Berry Moth link in the box titled Portland Pest Forecasts and you will be back at the results page (Figure 2).

Option 3: If you know where the station is located, you can use the map on the home page to quickly access the stations page. Click on the station location on the home page map – this is just another way to get to the stations page (Figure 4). Follow the directions above to get to the results page.

Once you are at the results page (Figure 2) you will notice that degree day accumulation is forecasted out for a period of 5 days using National Weather Service Forecasts. This should be a very helpful tool in planning any necessary GBM applications. At the bottom of the page there is a description of the Pest Status, as well as, guidelines on the need for any Pest Management practices for GBM.

Implementing the model

First and foremost, make a commitment to look at the model on a regular basis, determine when wild grape bloom occurs near your vineyard blocks, and follow through with the scouting and insecticide applications called for by the model. Keep in mind that the GBM model is designed to give you the ability to make a more informed decision with your GBM management practices. Your experience with your vineyard blocks will still play a key role in the successful implementation of model results.

Before accessing the model on NEWA, use the Grape Berry Moth Risk Assessment protocol, http://nysipm.cornell.edu/publications/grapeman/files/risk.pdf to develop a risk category for each of your vineyards. While the protocol timings for scouting and insecticide applications have been replaced by the new GBM model, the basic research and background in determining a vineyard's risk to grape berry moth damage is still sound. Use this risk classification to determine when scouting or insecticide applications would be called for. Using the GBM RA protocol, vineyards can be placed into three risk categories; high, low or intermediate.

The GBM RA protocol called for an automatic insecticide application (no scouting) for high and intermediate risk vineyards at 10-days post bloom. Research has shown that this timing did not significantly reduce GBM damage from later generations and is no longer being recommended *except* in severe risk vineyards experiencing significant crop loss on a yearly basis, or in high value vinifera blocks.

The model will help to time scouting and insecticide applications for the various risk categories as follows;

Severe Risk and High Value Vinifera
(Comparable to High risk using GBM RA Protocol)

- Immediate post bloom insecticide application
- Second insecticide application timed at 810 – 910 DD, depending on insecticide used
- Third insecticide application based on 15% damaged cluster threshold during scouting at 1470 – 1620 DD
- Third insecticide application, if needed, timed at 1620 – 1720 depending on insecticide used

High risk vineyards *(Comparable to Intermediate risk using GBM RA Protocol)*
No immediate post bloom application

- First insecticide application timed for the second generation at 810 – 910 DD depending on insecticide used.
- Second insecticide application based on 15% damaged cluster threshold during scouting at 1470 – 1620 DD
- Second insecticide application, if needed, timed at 1620 – 1720 depending on insecticide used

Low risk vineyards *(Comparable to Low risk using GBM RA Protocol)*
No automatic insecticide applications

- First insecticide application based on 6% damaged cluster threshold during scouting at 750 - 800 DD
- First insecticide application timed for the second generation at 810 – 910 DD depending on insecticide used.
- Second insecticide application based on 15% damaged cluster threshold during scouting at 1470 – 1620 DD
- Second insecticide application, if needed, timed at 1620 – 1720 depending on insecticide used

Intermediate risk vineyards

There are no longer intermediate risk vineyards with the new GBM DD model.

The team of researchers and extension staff are working on how to use the model for additional sprays later in the season. We continue to see late season damage coming in when the model, and research, calls for most pupae entering diapause (the overwintering stage) at 1700 DD.

The GBM DD model on NEWA should be routinely used to time scouting and spray applications for all vineyard blocks in your operation. Do not skip blocks because you have not had a problem in the past. This can result in feeling that grape berry moth came out of nowhere to become a problem across an entire vineyard block when in reality it has been building up over a number of years.

Because this model is still relatively new, I would suggest collecting as much information as possible through scouting during the suggested time frame. For example, at the time of this writing (July 17, 2014) vineyards located near Ripley, North East Escarpment and Harborcreek, the time for applying

an insecticide for the second generation of grape berry moth is well over. (see Table 1). The Pest Management text on the model suggests that you now prepare to scout all vineyard blocks when DD accumulation reaches 1470 to 1620 DD, a range of 150 DD or a span of approximately 6 days if the highs are in the lower 80's and the lows in the mid 60's. Try scouting near 1470, as well as, 1620 to see what differences you find. This could be very beneficial in fine tuning how you use the model. Again, the model is only as good as the information you have when you are trying to use it, from when wild grape bloom occurred to whether a block reaches, or exceeds, the threshold for treatment using the model.

According to the data from the grape berry moth model on NEWA on July 17, 2014 (Table 1), Niagara County appears to be the only area where there is still a good opportunity to use an insecticide which needs to be ingested (these insecticides should be targeted close to 810 DD). Materials that work through contact can still be applied in many of the remaining sites as they should be timed close to 910 DD.

The type of insecticide that is applied will determine when the application should take place. Materials that need to be ingested, i.e. Altacor, Belt and Intrepid (PA only), should be applied at 810 DD to ensure the material is on prior to the peak of the flight. Insecticides which work by contact, i.e. Baythroid, Capture, and Mustang Max should be applied later, at 910 DD. This is to allow more of the population to be present, and exposed to the application, when it is applied. There are a number of materials that work by both ingestion and contact (see Table 2). Keep in mind that in order to maximize the effectiveness of the ingestion mode of action the material needs to be on prior to the larvae feeding and entering the berry.

If you have had trouble with grape berry moth in the past you can trouble shoot your management strategy by answering the following questions.

1. Am I using the GBM model on NEWA to time my applications? While this model is still relatively new and will continue to be updated, it will give you a better estimate of the proper timing than the old calendar based method. Use the model and change the date of wild grape bloom (the biofix date to start collecting DD for the model) to see how it affects the model results. Identifying a wild grape in your area and using it each year to determine the biofix will allow you to fine tune the model for your operation.

2. Am I scouting on a regular basis? Since the model is new, additional scouting may be required to determine if your spray timing was accurate. Bad surprises at harvest are often caused by making an insecticide application in July and not following it up with scouting and further treatment if necessary.

3. Are you using the correct materials? If you continue to have a problem with grape berry moth it may be that the insecticides you are using are not doing the job you want them to. Try a new insecticide. While it may be more expensive, if it works, it will pay for itself in cleaner fruit that stays on the vine to be harvested.

4. Have I talked to a member of the LERGP extension team for help in determining where my program might be weak? If you ever have questions on your vineyard IPM practices you can give Tim, Andy or Luke a call. We would be happy to assist you in developing a program to address any pest problem.

If you have tried all of these you might have what is considered to be a severe high risk vineyard. In these cases it might be helpful to apply a different approach of bracketing sprays around each generation. Apply a material that needs to ingested at the beginning of the generation (810 DD or 1620 DD) followed by a contact insecticide 7 – 14 days later (spray interval will depend on the first insecticide used – Table 2 provides a guide to longevity of the materials). This strategy will not be necessary in the majority of vineyard blocks. Please feel free to give me a call at (716) 792-2800 X203 to discuss the pros and cons of this strategy before implementing it.

Honeyvine Milkweed in Lake Erie Vineyards

Andy Muza, Penn State Extesnion—Erie County, LERGP Extension Educator

A persistent, perennial, weed that has gained a foothold in a number of Concord vineyards in the Lake Erie Region is honeyvine milkweed. Growers often fail to notice this weed until harvesting when numerous seed pods are dislodged from the trellis causing contamination of grape bins.

Honeyvine milkweed (*Cynanchum leave*/ *Ampelamus albidus*) also known as climbing milkweed is native to North America. Although this weed is a member of the milkweed family it does not produce a milky white juice when stems or leaves are broken. This weed can be confused with bindweeds and morning glory species which are also climbing vines.

Plant Description

Honeyvine milkweed (HvM) is a twining, perennial vine which grows rapidly and can reach lengths greater than 10 feet. **Roots** - the root system consists of a deep taproot with many lateral roots. It reproduces both vegetatively (by sprouting shoots from buds on lateral roots) and by wind disseminated seed dispersal. **Leaves** (Figures 1 & 2) - are 1-3 inches wide, opposite on the stem with 2/node, heart-shaped with pointed tips. They are dark green with long petioles. **Flowers** (Figures 3 & 4) - are small, white and contain 5 petals. Flowers are produced in clusters in axils of leaves. **Pods** (Figures 5 - 7) - plants produce smooth, green pods which are 3-6 inches long. An HvM vine can produce as many as 50 pods per plant each containing numerous seeds (2, 4).

Research

The majority of the research on management of honeyvine milkweed has been conducted in annual crops (e.g., corn, wheat, and sorghum).

An experiment in continuous winter wheat using glyphosate (3.03 lbs ae/acre) applied at 19.45 gal of water/a for management of honeyvine milkweed (at 17.7 inches in length) reduced stem density 92% after 1 year. However, annual applications over a 3 year period failed to provide complete control. Incomplete control was attributed to survival of adventitious buds within the root system (3).

Experiments conducted in corn fields, in Virginia, revealed that a mid-May application of Roundup Ultra afforded only initial suppression of HvM with subsequent regrowth. Research indicated that any substantial control of sprouts from underground roots should not be expected until plants reach at least 1-2 feet in height. Significantly higher control was achieved when herbicides were applied in the pre-bloom (late June) and early bloom (mid-July) stages (1).

An herbicide trial conducted in grapes at the University of Kentucky Research and Education Center compared combinations of preemergent and postemergent herbicides for efficacy against honeyvine milkweed. Chateau 51 WG (12 oz/A) with Roundup WeatherMax 5.5L (24 oz/A) was the most effective treatment with 100% control of top growth at 28 days after the April 26 application. The Roundup application alone provided only 60% control of top growth. At 75 days after treatment the Chateau and Roundup combination provided 50% control of top growth compared to just 10% by Roundup alone. In another trial, applied on April 27, Chateau 51WG (at both 6 oz/A or 12 oz/A) in combinations with Gramoxone Max 3L (2 pt/A) provided 90 – 100% control of top growth at 34 days after treatment (2).

Management

Unfortunately, the majority of preemergence herbicides registered in grapes provide only partial suppression of this weed. High rates of postemergence herbicides (e.g., glyphosate, glufosinate, or paraquat) may kill the top growth of this weed but it is likely to produce new shoots from buds on the persistent root system.

Translocated herbicides, like glyphosate, are more effective on perennial weeds when applied during flowering and as late in the season as possible before weeds begin dying. However, these optimum spray timings are difficult in vineyards since HvM can become established in the canopy before it flowers and it may die before grape leaves drop in the fall.

Seven Steps for HvM management in vineyards

1. Early in the season, eliminate weeds under the trellis so that sprouting honeyvine milkweed can be detected. A weed free area under the trellis will make it easier to locate this weed so that a spot treatment program can be established. Vineyards that currently have HvM should try using a tank mix of Chateau and glyphosate in the spring.

2. Scout early, and frequently throughout the season, to identify areas with Hvm.

3. Flag honeyvine milkweeds and mark areas on your vineyard maps.

4. Check these areas, preferably weekly, to monitor development. Since HvM grows very rapidly, if monitoring is extended beyond a 2 week period, this vine may already start wrapping around trunks before a spot treatment can be applied. Assign someone the task of scouting and spot spraying for HvM so that this is routinely conducted.

5. Begin spot spraying with glyphosate (check label for restrictions/precautions/rates) using highest labelled rate when HvM is between 1 - 2 feet in length and/ or before vines start wrapping around grape trunks. Be careful not to allow glyphosate spray to contact green, grape tissue. The addition of ammonium sulfate under certain circumstances (e.g., hard water or drought conditions) may improve efficacy of glyphosate products.

6. Do not allow HvM to establish in the trellis and develop pods. If pods are allowed to mature these will split open and release large quantities of seeds which are wind dispersed. If HvM is discovered in the trellis then: 1) cut vine at ground level, place pods in plastic bag and remove plants from vineyard; or try 2) removing pods into plastic bag, pulling HvM vine off trellis and laying underneath row, then spot spray with glyphosate.

7. Keep records to determine effectiveness of HvM management efforts.

Be aware that honeyvine milkweed is unlikely to be eliminated in a single season. Targeted postemergent herbicide applications over a number of seasons will be required for success.

Prevention, Persistence and Consistency

The most effective control of HvM is to prevent establishment of this climbing perennial through scouting and early elimination. **Once established this weed is very difficult to eradicate**. Management attempts to eliminate HvM from a vineyard, or at least prevent further spread, will require a concentrated effort over a number of seasons which involves both persistence in monitoring and consistency in spot spraying.

References

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4. Ohio Perennial and Biennial Weed Guide – Honeyvine Milkweed http://www.oardc.ohio-state.edu/weedguide/singlerecord.asp?id=600

Honeyvine Milkweed photos of leaves, flowers and seed pods. Photos by Andy Muza, Penn State.

Fig. 1 *– Closeup of HvM leaf.* *Photo by Andy Muza, Penn State.*

Fig. 2 *- Mature HvM leaves in trellis with Concord leaf in upper left corner.* *Photo by Andy Muza, Penn State.*

Fig. 3 *– HvM flowers on long stalk growing from leaf axil.* *Photo by Andy Muza, Penn State.*

Fig. 4 – Cluster of HvM flowers. ***Photo by Andy Muza, Penn State.***

Fig .5 *- Flowers and developing Hvm pod.* *Photo by Andy Muza, Penn State.*

Fig. 6 *– Clusters of HvM pods.* *Photo by Andy Muza, Penn State.*

Fig. 7 *- Opened HvM pod with immature seeds.* *Photo by Andy Muza, Penn State.*

Return on Investment and the Cents of Bulk Juice Production

Kevin Martin ,Penn State University, LERGP, Business Management Educator

Return on Investment (ROI) is a simple concept designed to evaluate the efficiency of an investment. In turn, it can be used to compare similar investments. Since capital is a finite resource, we can use ROI as one tool in a decision-making toolbox. Understanding the basics of ROI is relatively straightforward. Manipulating the inputs to accurately reflect the information you need to make a specific decision is a bit more nuanced.

The formula for ROI follows:

$$ROI = \frac{(Gain - Cost)}{Cost}$$

Gain and cost, however, are fairly ambiguous terms. Different definitions of gain and cost may be valid for purposes of an ROI calculation, to answer specific questions. Different definitions may also be used to suit the needs of an analyst or salesman. While no specific definition is required for accuracy, when using ROI to assist in the decision-making processes, it is essential to understand these inputs.

When making an investment in a vineyard, a grower considers the ROI of his investment over the short term. In his particular expansion from 100 to 150 acres he does not believe capital investment in equipment will be necessary. He plans on marketing the grapes on the cash market. He also has a fairly good understanding of material and labor costs he realizes over his current 100-acre farm. For him, expenses are rather minimal, compared with other growers. Most of his equipment costs are fairly marginal, as no new investment is required. Depreciation of that equipment will be slightly faster. Expenses are mostly operating, interest and labor.

$$ROI = \frac{(1350 - 1125)}{1125}$$

$$ROI = 20\%$$

While this grower is relying on marginal costs to compute his ROI, another grower is ecstatic about his neighbor's newfound profitability. When another vineyard comes up for sale he purchases 100 acres, expanding his holdings from 150 to 250 acres. To keep things simple, all expenses remain equal, except this grower realizes an expansion will require him to rework harvesting. The good news, he will not incur labor costs for harvesting the additional acreage as the previous grower did. The bad news, he will have to reduce the amount of custom harvesting he does. While another option would be to buy an additional harvester, the grower determines cutting back is the least bad and most profitable option.

Reduction in Custom Operation

$$ROI = \frac{(1350 - 1285)}{1285}$$

$$ROI = 5\%$$

Purchase New Harvester

$$ROI = \frac{(1350 - 1450)}{1450}$$

$$ROI = -6.9\%$$

Well, at least he is not loosing money if he reduces the custom harvest operation. An established grower should avoid unnecessary risk associated with this type of expansion, in most cases, for such a low return on investment. Other variables, such as interest rates or purchase price, could sway a grower one way or another by increasing or decreasing the return on investment.

A new grower may need to calculate ROI very differently. With no equity or capital invested in farming, the decision to purchase grapes creates a need for capital investment. Tractors, equipment, financing, and even education are all costs that

may need to be considered. To begin with, the conservative yield estimates shown above will simply not work. If a vineyard is average for the region, at 5.5 tons per acre, a new grower will not be able to justify paying market value for the vineyard. A new grower should seek out an above average to excellent site, preferably in disrepair. Without years to accumulate wealth, sweat equity becomes a reasonable alternative. The grower also needs to look at ROI from a cash flow perspective, and heavily discount delayed payments.

$$ROI = \frac{(2200 - 2{,}125)}{2{,}125}$$

$$ROI = 3.4\%$$

To ensure the yields necessary to sustain a ROI as a new grower, significant vineyard investments are required. Given the variability caused by weather alone, it is nearly impossible to do this without crop insurance. The ROI shown above also averages in significantly more years than earlier. To create a positive ROI, a typical new grower may need at least a decade. A simple vineyard expansion could create a reasonable return in less than half that time.

Start up assistance can make all the difference to a new grower. Building the wealth required to sustain a reasonable salary and generate a small ROI above that salary draw is a real challenge. Start up assistance can take many forms. Gifts of land, labor and capital are all obviously helpful, but not always practical. Shared equipment agreements, however, can be a low cost strategy. Taking the example above, this following grower buys a high quality site in good condition. The higher purchase price decreases the labor required by this new operator. He helps out a more established grower in exchange for an equipment share agreement.

$$ROI = \frac{(1300 - 1175)}{1175}$$

$$ROI = 11\%$$

These ROI examples do not in any way directly compare to each other. In my estimation, though, they represent the best tools for the specific example given. Not understanding the components of an advertised ROI is one common mistake. Another common mistake is trying to count all costs toward every decision. In doing so, a vineyard expansion might be incorrectly perceived as unprofitable. In reality, the costs associated with the new vineyard are costs that were already being incurred and would continue to be incurred whether the expansion happened or not.

While we are seeing a lot of evolution in the industry, the majority of growers are fairly stagnant. While that may have some negative connotations, a right sized vineyard is typically the easiest to manage. Even if an expansion may enhance the bottom line, it may be a decade before an investment is cash positive. For someone in their twenties, waiting a decade makes a lot of sense. For someone in their sixties, maintaining current profitability and realizing gains currently makes more sense. A typical one hundred acre grower controlling equipment expenses and maximize vineyard production investments may reasonably expect an ROI like this:

$$ROI = \frac{(1787 - 1681)}{1681}$$

$$ROI = 6.3\%$$

Another important take away from this article is that these numbers are based on real-world examples. The general ideal that most growers are expanding is based on the economies of scale often realized in expansion. Not to be overlooked, however, are the growing pains and lack of efficiency realized in an expansion. Right sizing equipment to an operation is a common source of inefficiency in vineyard operations. Maximum efficiency of all vineyard equipment is impossible. However, approaching maximum efficiency on key components can be the difference between profit and loss.

Upcoming Events

Don't forget to check out the calendar on our website (http://flgp.cce.cornell.edu/events.php) for more information about these and other events relevant to the Finger Lakes grape industry.

FLGP Tailgate Meeting

Tuesday, August 5 5:00 – 6:30 PM

Hunt Country Vineyards

4021 Italy Hill Road, Branchport NY 14418

Our next Tailgate Meeting will be held on Tuesday, August 5 at 5:00 PM at Hunt Country Vineyards in Branchport.

These meetings are held every other week at various grape farms around the Finger Lakes, and are intended to be informal, small-group meetings where FLGP staff and growers can ask questions and discuss issues about vineyard management, IPM strategies or other topics appropriate for that point in the growing season. Growers are eligible to receive 0.75 pesticide recertification credits at each meeting this year.

Here are the dates and locations of the rest of our Tailgate Meetings this season.

Date	Address
August 19	Dr. Frank's Vinifera Wine Cellars, 5230 Route 414, Hector NY 14841

Become a fan of the Finger Lakes Grape Program on Facebook, or follow us on Twitter (@cceflgp). Also check out our website, "The Grape Lakes – Viticulture in the Finger Lakes" at http://flg.cce.cornell.edu.

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