Lake Erie Regional Grape Program

Vineyard Notes-June 2017-Special Edition

Grape Insect and Mite Pests-2017 Field Season Abridged Edition

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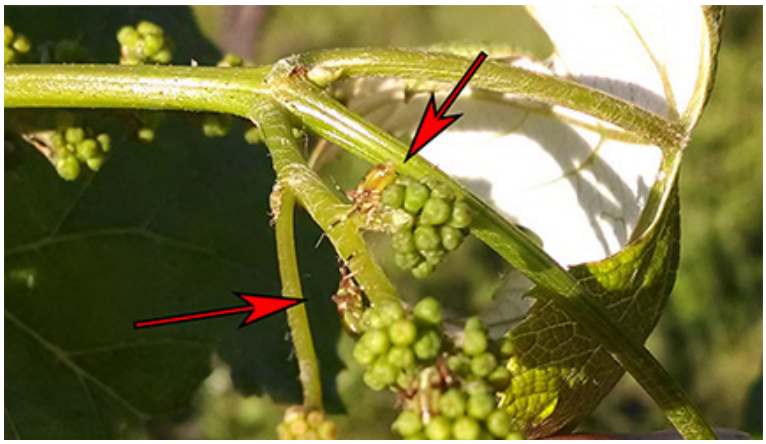
The annual spring grape insect and mite pest review is a bit late for 2017 for which I apologize. At the time of this writing (June 6) grapes in NY and PA are way past budbreak and are inching closer to bloom. As has been the case the last few years, it's been a cool spring following a pretty mild winter. It's also been particularly wet this year as I am sure you are all very aware. These conditions generally favor grape diseases and not so much insects, but there is still a lot of the season left for things to warm up and dry out. For the last ten years or so I have been keeping track of 50% bloom for a number of different grape cultivars and the riverbank grape *Vitis riparia* planted in a mixed cultivar/species trial that we have at NYSAES in Geneva. Over the last five years (2011-2016) the clone of *V. riparia* in this planting has reached 50% bloom on 1 June, 26 May, 29 May, 3 June, 30 May, and 2 June. I checked the *V. riparia* in our planting yesterday and it was at about 30% bloom. So we are a little delayed this year, but given the forecast of warm to hot weather over the next week, I suspect we will catch up pretty quickly.

Because I am late for this review, I decided to make this an abbreviated version of my usual entomology spring review, focusing on arthropod pests that seem to be causing problems for segments of the grape industry and/or update you on ongoing research. As always, I want to acknowledge and thank my Cornell colleagues and collaborators at Geneva, Portland, and Ithaca and the extension educators out in the grape growing regions of NY State.

Which arthropod pests are causing problems?

1. Reminder to scout for plant bugs

There are several species of plant bugs, but we are particularly concerned about banded grape bug and *Lygocoris inconspicuous*, that feed on flower buds causing shot berry and entire clusters to abort. It's the immature stage of the insect that does the damage. By bloom they have matured into adult bugs and no longer present a risk. Populations are usually low and scattered so in most years and at most sites they are not an economic concern. But it does not take many plant bugs to cause economic damage (low economic threshold) so it's worth scouting for them prior to bloom (right now). Look carefully at clusters (both sides). Banded grape bug is greenish brown with banded antennae and *Lygocoris* is pale green. Threshold for treatment is around 1 bug per 10 shoots. A video demonstrating scouting techniques for banded grape bug can be found at https://www.youtube.com/watch?v=FrEJ6IJB_is



Banded Grape Bug on cluster

2. Update on grape mealybugs and soft scale insects

Issues with grape mealybugs and soft scales are most relevant for vinifera grapes because they are vectors of grape leafroll disease. For various reasons, we do have a fair amount of grape leafroll disease in vinifera plantings in NY and surrounding areas and we know that even pretty low populations of grape

mealybugs and soft scales (we have two species in our area, European fruit lecanium scale and cottony maple scale) can cause the disease to spread. We also have some data indicating that using an insecticide to control grape mealybug can slow the rate of spread, but it's unclear how effective controlling the vector is in stopping spread without also rogueing out symptomatic vines. We are testing this question at a vineyard in the Finger Lakes that has a low level of disease and a moderate population of mealybugs. We have four treatments (with replication): rogue out leafroll infected vines and the two neighbor vines on either side within a row, treat vines with insecticide (Lorsban Advanced at budbreak and Movento during the season), rogue and treat with insecticide, or do nothing (control). We will measure mealybug populations and virus status of every vine over several years. Stay tuned.

In the meantime, I do get questions from growers about chemical control of mealybugs and soft scale. There are actually multiple options labeled for use in NY for grape mealybug. Fewer options are labeled in NY for soft scale. See Grape Pest Management Guidelines for a full listing. For both pests, there are two times during the season where chemical control is potentially effective: in the spring at or just prior to budbreak targeting the overwintering stage of the insect and during the growing season right after egg hatch targeting the crawler stage (first instar immature). A delayed dormant oil application has been shown to be effective in controlling soft scale in other crops and I would expect it would work in grapes, though I have not specifically tested this. The oil smothers the soft scale, which are often out on the canes where they are exposed. Delayed dormant oil was not very effective against grape mealybug in our trials, however. We believe that is because the overwintering mealybug crawlers are protected under loose bark on the trunk. We are now testing Lorsban Advanced just prior to budbreak against overwintering crawlers.

During the growing season the systemic insecticide Movento [spirotetramat) has been very effective in controlling grape mealybug in our trials (2 applications, 6.25 fl oz/A per application, 30 days apart). Movento may provide some suppression of soft scales. Indeed, the newest label of Movento (July 2015 in NY) now includes suppression of European fruit lecanium scale. The neonicotinoid insecticides Admire Pro [imidacloprid] and Platinum [thiamethoxam] (not allowed on Long Island), when applied through a drip system and therefore systemic throughout the vine, are effective against grape mealybugs. Admire Pro also includes European fruit lecanium scale on the label when applied via drip to soil.

Other insecticides labeled for mealybugs or soft scale insects are not systemic and should target the crawlers (active stage after hatching). Since the crawlers actively move around the vine they are more likely to get exposed to the insecticide residue. The question is how to time egg hatch? Right now we don't have a validated degree-day model to predict this timing. A number of years ago, however, we did obtain some initial estimates and found egg hatch for grape mealybug occurred at around 800 DD (starting Jan 1, base 50 F) which that year was around July 1 while we observed the first crawlers of soft scale insects at around 650 DD (starting Jan 1, base 50 F) which that year was third week of June. If you do have soft scale insects or mealybugs in your vineyard, one thing you can do is check the status of eggs underneath soft scale (mostly on canes) or adult grape mealybug females (under loose bark on trunk wood). With a hand lens you should readily be able to see the eggs and crawlers if present.

3. We are seeing more severe damage from grape cane gallmaker

Grape cane gallmaker is a small, reddish brown weevil that has been considered a minor pest of grapes, generally not requiring control. It seems to be becoming a more consequential pest in some grape growing areas in NY, especially around Keuka Lake. The adult is active in the vineyard in the spring from mid-May through June. The female weevil hollows out a small cavity along the shoot just above a node and places a single egg. She fills the cavity with frass (poop) and then goes on to create additional cavities along the shoot (up to 14). More than one weevil can attack a shoot. In response to the adult weevil feeding damage, the vine forms a gall (swelling) around each of the cavities, which becomes red in

red-fruited cultivars. There are a limited number of products labeled for grape cane gallmaker including Danitol, Baythroid, and Leverage. In severe situations, multiple applications, starting at 2-4 inch shoot growth, may be necessary to get things under control.

Grape Gallmaker

4. Grape rootworm re-emerging as significant pest in some areas

Since the sixties, broad-spectrum insecticides targeting grape berry moth greatly reduced the impact of grape rootworm. However, with the use of more selective materials and less use of insecticide overall in recent years, growers are observing more evidence of this pest, especially in the Lake Erie Region, but also in the Finger Lakes. Grape rootworm is a relatively large (5/16 – 3/8 inch in length), brown beetle in the Family Chrysomelidae (flea beetle family). The adult feeds on leaf material, creating characteristic chain like feeding damage. This damage is not economically significant, though it is useful to help diagnose their presence. The adults themselves are often hard to find unless populations are quite high. The adults emerge over the middle part of the season, starting around bloom and stretching into middle July to early August in some years. After an initial bout of leaf feeding, they mate and the females lay clusters of eggs on older canes, often under loose bark. The eggs hatch and the larvae drop to the ground where they work their way into the soil to find fine grape roots to feed on. Feeding damage by larger larvae cause reduced vine growth and vigor, increased vulnerability to stress, and reduced yields. We don't have a well-defined economic threshold for grape rootworm. Vines can tolerate some root feeding but if the vigor of the planting is in decline and you are seeing noticeable leaf feeding damage from adults, then grape rootworm is a likely cause.

Adult Grape Rootworm

There are five different insecticides labeled to control grape rootworm: Sevin, Sniper (2ee), Danitol 2.4 EC (2ee), Leverage 360 (2ee), and Admire Pro (2ee). Even though the adult stage does not cause significant damage to vines, it is the target of the insecticides to prevent egg laying and larval infestation. Adult female grape rootworm require a week or two of leaf feeding (pre-oviposition period) before they start to lay eggs. Hence, knowing when adults have emerged from the ground is critical to successful chemical control. We currently do not have any systemic insecticides labeled for use against grape rootworm.

5. Timing insecticide control of late-season grape berry moth

As most of you know, grape berry moth (GBM) is probably the most significant insect pest of cultivated grapes in the eastern US. The larvae of this smallish moth feed on grape clusters, ripening and ripe berries causing reduced yields and creating sites where fungal and bacterial diseases can develop. They are also a contaminant in juice grapes. The risk from GBM varies depending on year and site and also on the value of the crop with higher value wine grapes at greater risk. There are many grape plantings in NY and surrounding states at low risk that generally do not require any chemical control for GBM while there are other plantings that have a history of high populations and significant injury that are at high risk and require several

insecticide treatments most years.

GBM has several flights during the growing season (2-4) starting around bloom and continuing, in some years, into September. A temperature-driven phenology model has been developed for GBM, using bloom date of wild grapes as the starting point for accumulating degree days (biofix), that helps predict timing of egg-laying associated with these flights. Knowing when most eggs are laid is important for effective chemical control since insecticides mostly target the young larvae before they have a chance to enter the berry where they are pretty protected. The GBM phenology model is available to growers through the Network for Environment and Weather Applications (**NEWA**) web site (http://newa.cornell.edu/) along with management guidelines. The model is most useful for timing the second and third flights of the season, but less helpful for timing subsequent flights. The reason is that by late season, the flight period becomes less synchronous and spread out such that eggs are being laid continually. **Therefore, we are now recommending growers use the phenology model to time the second and third flights but beyond that, in warm years and for high risk sites, growers should continue spraying on a 7 to 10 day rotation until about mid-September when egg laying pretty much stops.**

GBM on Concord berry

Shelling of Concord berries caused by GBM injury

Concord berries with GBM injury

6. Controlling fruit flies can help manage sour rot

Sour rot is a more appropriate topic for Wayne Wilcox's spring Opus but I did want to highlight the role of Drosophila fruit flies. Based on research led by Megan Hall, a PhD student with Wayne, we have good evidence that several species of Drosophila fruit flies, including spotted wing drosophila, the relatively new invasive fruit pest, are important in spreading and enhancing sour rot symptoms for susceptible varieties. Several factors are involved in determining risk of sour rot including cultivar (tight clustered cultivars seem more prone to sour rot), the year (warm and wet conditions favor disease development), fruit phenology (ripening fruit with Brix around 15 or more), fruit injury due to bird or insect damage, and presence of fruit flies. When factors align to promote sour rot, we have good data showing that applying an insecticide targeting fruit flies can significantly reduce incidence and severity. Drosophila fruit flies are susceptible to a number of different insecticides including organophosphates (e.g. malathion), pyrethroids (e.g. Mustang Max [zeta-cypermethrin]) and spinosad type insecticides (e.g. Delegate [spinetoram] or an organic alternative, Entrust [spinosad]). Since

fruit flies are only a threat near harvest, insecticides with relatively short DTH restrictions are the most helpful. Check the grape pest management guidelines for more specific details. You can also find more information about spotted wing drosophila at http://www.fruit.cornell.edu/spottedwing/.

There are a number of additional arthropod pests that can be problematic in grapes in our area, many of which were covered in the 2016 review that you can find at http://www.fruit.cornell.edu/grape/pdfs/Loeb-Grape Insect Mite Pests 2016.pdf. During the season if you have questions or concerns you can contact me at gme1@cornell.edu or 315-787-2345. Have a great season and I will see you out in the vineyards.

Using NEWA Resources in a Vineyard IPM Strategy – Tim Weigle

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 Protect 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. This type of knowledge has been developed by the research faculty and extension staff at Cornell and Penn State Universities.
Weather information is also a key component of any vineyard IPM strategy. In and of itself, weather information can help in 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 the materials (active ingredient or mode of action) used
4. A need to add sprays or the opportunity to eliminate them

The best resource available for growers to monitor the weather and its effect on grape pests is the Network for Environment and Weather Applications (NEWA). What is NEWA? Available on line at http://newa.cornell.edu, NEWA provides web-based weather data and pest forecasts across New York State and in Erie County, PA. In fact, NEWA has grown to include 26 states and far more weather stations than I care to count. These sites include Rainwise weather instruments located in grower's vineyard, fields and orchards as well as airport weather equipment.

Upgrades to the insect and disease models displayed on 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, downy mildew, Phomopsis and grape berry moth. Each weather station has its own Station Page where you will find links to the pest forecasts (Grape diseases, Grapevine downy mildew and Grape berry moth) as well as a wealth of weather information.

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

1) Weather records
    a. Daily summary of weather parameters (i.e. temp, rainfall, leaf wetness, relative humidity)
    b. Hourly recording of weather parameters
    c. Historical weather records
2) Pest models and forecasts (grapes)
    a. Grape berry moth phenology based Degree Day model
    b. Primary infection events for
        i. Powdery mildew
        ii. Black rot
        iii. Phomopsis

    c. Downy mildew DMCast model of infection events by grape cultivar
3) Growing Degree Day (GDD) information (base 50F used for grapes, other base temps available)
4) National Weather Service forecasts
5) National Weather Service radar

The weather and pest model information is of greatest value the closer it is to your vineyard. In a perfect world, there would be a weather station for every vineyard block to generate the best pest forecast model results specifically for your vineyard block(s). The best way to get an idea of where these machines are located in reference to your vineyards is to scan the location map on the NEWA Home Page or click on Stations Pages in the main menu to access a list of alphabetized station names.

While there are a large number of weather instruments on the NEWA website, they may not all be located in vineyards. However, the information those instruments 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 1 is a screen shot of the Portland, NY (located at CLEREL) station 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 first is to look at the physical Station Location box, which provides 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 red flag that the temperature and humidity may not accurately reflect the conditions found in your vineyard.

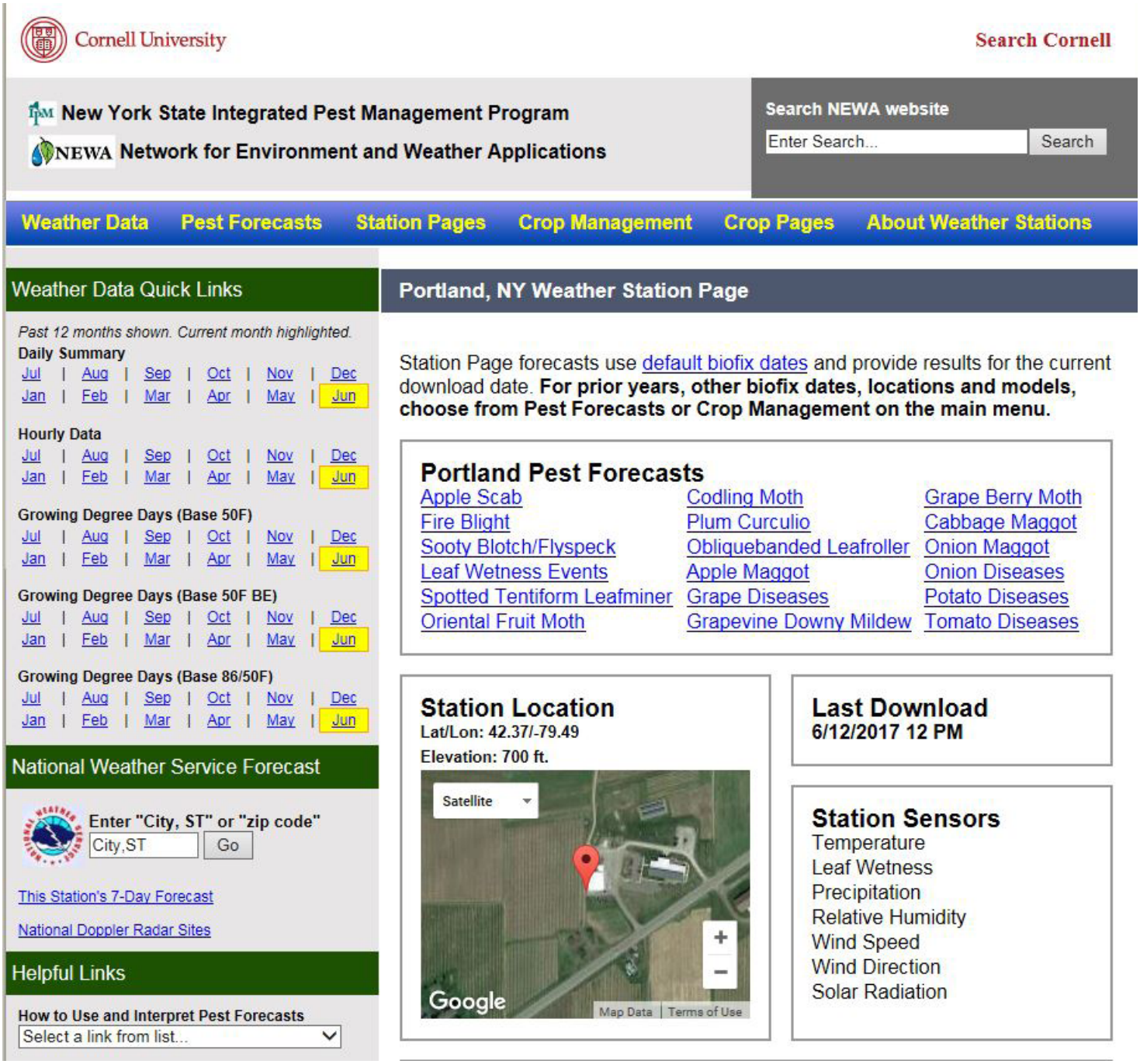
The box title "Portland Pest Forecasts" provides quick reference links to the various pest forecasts. In this case you can see that Grape Diseases, Grapevine Downy Mildew and Grape Berry moth models are all available. The main drive of what pest forecasts are available is the range of weather sensors that record weather parameters and feed them to NEWA. 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. Juliet Carroll and the group at the Northeast Climate Center have teamed to up to provide information from virtual sensors, which you may see with leaf wetness and airports. Using the Buffalo airport as an example, their station does not have a leaf wetness sensor (check out the Station Sensors block on the Buffalo Station Page) but when you look in the Grape Diseases you find that they can provide information on black rot and Phomopsis primary infection events which require information on duration of leaf wetness events. Just keep this in mind and check out the available sensors on the station pages of the instruments you are looking at. The virtual data can still be valid, but be aware it is data that is developed using information other than that of a sensor located at that site.

You can access model information for powdery mildew, black rot, Phomopsis, downy mildew and grape berry moth through the Pest Forecasts found on a specific station page or by using the Pest Forecast drop down menu found in the blue ribbon found near the top of each page of the NEWA site and selecting Grape Forecast models. Used on a regular basis, the model information can assist in determining whether the spray interval for these diseases should be tightened or extended. The Grape Diseases forecasts operate like a 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 choose the phenological state of your crop to customize the results for all the different varieties in your vineyard operation. While the ability to interact with model parameters by inputting vine growth stage is not available when accessing them from the Station Page Pest Forecasts, all you need to do is access the models through the Pest Forecasts in the main menu as described above.

The phenology-based degree day model for grape berry moth found on NEWA was developed as a cooperative effort between research entomologists and extension staff at Cornell, Penn State and Michigan State

Universities. Greg Loeb and Tim Weigle (Cornell), Mike Saunders, Jodi Timer and Any Muza (Penn State) and Rufus Isaacs (Michigan State) have led the development of the model and the helpful hints on pest status and pest management options at different levels of growing degree accumulations. This model uses wild grape bloom as a biofix date to start accumulation of degree days and allows you to input the date of wild grape bloom for your vineyard block(s). While the model will provide you with a default date, the ability to enter the actual date you observed wild grape bloom makes the information provided by the model much more valuable.

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 your current knowledge of your vineyard blocks, susceptibility of your varieties, and the materials you are using for managing the pests to implement a sound vineyard IPM strategy.



LERGP
2017 COFFEE POT MEETING SCHEDULE

Date	Time	Location	Address
May 3, 2017	10:00am	John Mason Farm	8603 West Lake Rd. Lake City, PA 16423
May 10, 2017	10:00am	CLEREL	6592 West Main Rd. Portland, NY 14769
May 17, 2017	10:00am	Brant Town Hall	1272 Brant Rd. Brant, NY 14027
May 24, 2017	10:00am	Peter Smith Farm	4472 Van Dusen Rd. Lockport,NY 14094
May 31, 2017	10:00am	Dan Sprague Farm	12435 Versailles Rd. Irving, NY 14081
June 7, 2017	10:00am	Betts' Farm	7365 East Route 20 Westfield, NY 14787
June 7, 2017	3:00pm	Archer Pratz Farm	9318 Lake Rd. North East, PA. 16428
June 14, 2017	10:00am	Jeff Schultz Farm	2707 Albright Rd. Ransomville NY 14131
June 14, 2017	3:00pm	Orton Farm	10646 West Main St. Ripley, NY 14775
June 21, 2017	10:00am	North East Fruit Growers	2297 Klomp Rd. North East, PA 16428
June 21, 2017	3:00pm	Kirk Hutchinson Farm	4720 West Main St. Fredonia, NY 14063
June 28, 2017	10:00am	Peter Loretto Farm	10854 Versailles Plank Rd. North Collins, NY 14111
June 28, 2017	3:00pm	David Nichols Farm	1906 Ridge Rd. Lewiston, NY 14092
July 5,2017	10:00am	Leo Hans Farm	10929 West Perrysburg Rd. Perrysburg, NY 14129
July 12, 2017	10:00am	Szklenski Farms	8601 Slade Rd. Harbor Creek, PA 16421
July 19, 2017	10:00am	Liberty Winery	2861 Route 20, Sheridan, NY 14135

2017 LERGP Summer Grape Growers' Conference

Friday August 11, 2017
at CLEREL
6592 W. Main Rd.
Portland NY 14769
9:00am-4:00pm

Summer Grape Grower Conference with a focus on Efficient Vineyard SCRI project, Variable Rate Management, Cover Crops, NEWA, GBM and Business Education. *$20.00 per person includes program, morning refreshments and a catered lunch. For more information, please call Katie 716-792-2800.*
Register at https://lergp.cce.cornell.com

2017
LERGP Hops Production in the Lake Erie Region Conference

Saturday, August 19, 2017

CLEREL-6592 West Main Rd. Portland, NY 14769

9:00am-4:00pm

$50.00- includes program, morning refreshments and a catered lunch

Join us for a day of Hops talks and a harvester/harvesting demonstration, followed by tours of the hopyards with time for open discussion.

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