



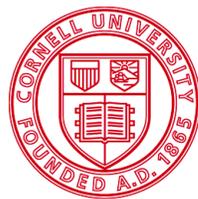
The Lake Erie Regional Grape Program



Vineyard Notes

November Harvest Issue 2018

The Beauty of Nature, Monarch on Sunflower- photo by Andy Joy, CLEREL



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Business Management

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

Enterprise Analysis: Avoiding the Pitfalls of Change and Investment

The struggles of the Concord grape market have attracted the attention of NYS. One of the things this might mean for some NYS growers is the ability to increase their flexibility and diversify the agricultural operation. Programs as a result of the Concord summit have started to get rolling. On the supply side of things, proposed solutions included product development research, state contract and school lunch purchases and product development or value added grants. One of the largest programs announced specifically targeted the demand side. The Vineyard Improvement Program helps growers diversify, remove and renovate existing vineyards and to provide assistance in replanting to in-demand cultivars. This program does require the actual removal of concord vines to receive funding.

While the details of this program have yet to be established it might be a good time to start thinking about the conditions that justify participation in this type of program. Historically, assistance for removal or establishment have come from the private sector. The Niagara planting program was the most recent large scale example of assistance on the east coast. Performance of those vineyards varied considerably as some growers realized significant and convenient profits in a cultivar that was compatible with their business operation. Others were not so successful. Incentives led to rapid plantings without adequate analysis of site location. Even with subsidized plantings, regular winter injury lead to financial loss and decreased the overall profitability of the farm.

This program can subsidize three distinct business activities. Concords need to be removed. Once that happens a grower can plant cover crop, at his own cost. A grower can receive subsidies for planting new concords, perhaps renewed and set up for mechanization. A grower could also receive subsidies for planting any perennial crop.

Current market trends complicate matters further. I anticipate the market for cultivars, other than Concord, to grow slowly. Given the state of the wine market, finding a market for new varieties will be a challenge in the short term. Therefore, finding a market will be the first hurdle. Given there is a market hurdle, assumptions about prices should be conservative (unless guaranteed by a long-term contract). The most obvious example is Marquette. If speculative plantings continue, the price of Marquette will likely fall by hundreds of dollars per ton. Price risk, particularly for high priced hybrids and natives, should be anticipated.

Despite obstacles, it's important to remember that the Niagara planting program was a great benefit that actually continues to benefit certain growers despite changes in the Niagara market. The best practice before changing the direction of a vineyard operation is to develop an enterprise budget. Enterprise budgets estimate profitability for the activity based on estimated production costs and management practices. One of the key benefits to an enterprise budget is a list of assumptions that are used to calculate profitability. These assumptions highlight key variables and allow for an open and frank discussion with other growers, industry and extension to get feedback on how realistic a plan is. LERGP will be administering the program and part of the application will require an enterprise business plan. The information below will provide a good start to developing a plan. If you need more assistance, LERGP can help with that as well.

LERGP has the research based information as well as the resources to help growers think critically about the most important assumptions that relate to an enterprise budget. For a vineyard, these assumptions

include labor costs, average yield, distribution of yield, and price. Other costs will factor into profitability but tend to be less variable from farm to farm and year to year. Even when a cost like fuel gets expensive, it tends not to be the driver of profit vs. loss.

A brief business plan helps to articulate how the enterprise fits into the existing business. It provides information like the size of the farm and the current state of profitability on the farm. What is the mission of the farm?

Description of Farm:

- _____ consists of 205 acres of wholly owned grape acres, primarily Concord.
- Diversified agricultural investments value added products and field crops provide some diversification in income sources.

Statement of Purpose:

- The fundamental purpose of _____ Farms is to:
 - 1. Supply local processors with high quality grapes and enhance the value of the business for future sale.
 - 2. To ensure economic and environmental sustainability of production through constant and conservative investment and innovation.

This particular farm exists only to produce grapes for processing. Any business plan that involves interaction with retail, creation of value added products, processing or custom hire will potentially change (perhaps dramatically) the scope of business. A more detailed plan would be prudent in that situation. If this farm already has 5 acres of Riesling and 100 acres of Concord an additional 3 acres of Ives would be well within the current operational expertise of the business. The analysis can be much more brief when the scope of the project is so narrow.

Interestingly, this farm has already diversified into field crops and value added crops sold at a local stand. While there is no retail experience the farm has a more diverse set of equipment and experience growing crops other than grapes. There are possibilities that other crops might be efficiently managed on this farm. With the Concord acreage being so sizable, it is also possible that retooling to different cultivars, expanding Concords, or reducing Concords to increase other products are all reasonable possibilities for this farm.

A review of profits and loss is a straightforward indicator of farm strength. Of course, we expect thin margins and low profits for many vineyard operations. Along with a debt:profit ratio these two indicators provide a window into the capacity of the farm to change direction. Any potential subsidy would reduce the intensive capital investment generally associated with strategic change. It is fairly likely, though, that there will still be short-term cash flow burdens associated with larger projects.



This actual chart of revenue, expenses and net income shows a dramatic decrease in profitability. In 2015 this farm sustained losses, which were followed in 2016 by profits near \$0. Despite these challenges, debt remains at \$0 and expenses remain flexible as the farmer has the ability to reduce depreciation expenses to fund projects that increase profitability.

Paid labor expenses, for this farm, reduce flexibility. Long-term profitability and sustainability is a risk for this operation because of paid labor expenses.

Next, a grower identifies strategies to improve profitability. Those strategies are then linked to a project. As the farm identifies strategies to improve profitability, paid labor would typically be one area to target. In previous grants, the reduction of paid labor did not align with the goals for the farmer. Decreasing unpaid labor was highly desirable, even at the expense of profitability. For this grower, different Concord markets, different varieties and efficiencies in the operation are all possible projects that would improve sustainability and profitability.

The key element of the business plan is a five to ten year forecast. Defining assumptions that forecast an improvement to profitability are key to the success of communicating plans with external people. A vineyard improvement cost will vary considerably based on techniques and timing. On the revenue side, the type of grape and the market the grape is sold will be the most significant factors to consider. If land is planted to other crops, more detail might be required. Rather than just adding to marginal costs capital cost in the equipment side could be necessary. Justifying equipment cost with conservative product pricing forecasts will be key to success and sustainability.

For growers that want assistance with this process, LERGP can help. Whether the enterprise analysis is for a grant, loan or just a strategic shift the grower wants to undertake, just contact me. In the context of a complex and lengthy downward trend in Concord pricing; support for research, extension and industry is a key element to long-term sustainability. As other Concord regions have dramatically shifted away from grapes we may be in a position to improve our relative efficiency and capitalize on the next cycle.

Do you need your vineyard GIS maps updated?

If you have made changes to your vineyards since your maps were made or have yet to get them made, we are here for you! Winter is a great time to stop in and talk with Kim to get those adjustments made.

You can contact her at 716-792-2800 ext 208, or email at ksk76@cornell.edu.

Just a reminder that we still map vineyards for our members free of charge. Non-members there is a nominal charge of \$10 per polygon (vineyard block) plus \$1 per acre with a minimum charge of \$11. Also, if you are a member of National Grape, they prefer you make changes through Jessica.

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IPM Season Wrap Up

Tim Weigle, NYSIPM, Cornell University, LERGP Team Leader

NEWA – The 2018 growing season saw the Lake Erie Mesonet of stations reporting the Network for Environment and Weather Applications <http://newa.cornell.edu> grow significantly. This growth came about through the incorporation of two stations involved with the NYS Mesonet, Fredonia (Chautauqua County) and Burt (Niagara County) now reporting data to NEWA as well as six Rainwise stations erected in 2018 in Hanover, East Fredonia, Forestville, Brocton, Ripley Escarpment and Ripley Stateline. Stayed tuned as we are projecting 4 more stations before the end of 2018. The intention is to move across the state line to improve coverage in the vineyards in Erie County, PA. NEWA is not just for the growing season as you can access hourly weather data throughout the year so it is the perfect site to consult if you need to know how cold it got, and how long it stayed there. NEWA also provides the ability to go back through the growing season and retrieve both weather and pest model information by date. This feature is invaluable to help determine what happened if your spray program did not perform like expected. This project is supported by the Lake Erie Regional Grape Research and Extension Program, Inc., NYS Wine & Grape Foundation and the NYS IPM Program.

Coffee Pot Meetings – Weekly Coffee Pot meetings wrapped up for the season at the end of July. A total of sixteen meetings were held in the 5 counties involved in the LERGP; Chautauqua, Cattaraugus, Erie and Niagara Counties in New York and Erie County in PA and were attended by a total of 266 growers and members of the Lake Erie grape industry. Not only did participants have the opportunity for a free cup of coffee and a donut (or two), they also had the opportunity to sign up for pesticide recertification credits for both New York and Pennsylvania. Coffee Pot meetings start the first Wednesday in May with morning meetings only and switch over to morning and afternoon meetings in June when we hit the critical times of the growing season. Coffee Pot meetings provide growers and the LERGP team a chance to learn from each other, as there is no set agenda. Questions from participants guide the conversation and reflect what growers see as the most pressing needs. Meeting at grower venues help to make each Coffee Pot unique as the large geographical area of the Lake Erie grape belt exposes the diversity of growing conditions and pest pressures between the different areas of the Lake Erie Region. Our partners in the Lake Erie Regional Grape Program fund this project.

Farm Bill Pest Survey – Sometimes also known as the Commodity Ag Pest Survey (CAPS) this project is a statewide effort that monitors for invasive species not yet known to be in New York State. Forty-two vineyards and four nurseries located in the Lake Erie Region, Finger Lakes, Hudson Valley and Long Island cooperated in the project. Four hundred ninety-six pheromone traps were deployed for four target pests; European Grapevine Moth, Light Brown Apple Moth, European Grape Berry Moth and Vine Mealybug. Visual inspections for Spotted Lanternfly, Australian Grapevine Yellow, Solbur disease, Flavescence doree and Grapevine Red blotch virus were completed with only Grapevine Red blotch virus found. As in past years, no target moths were found during the seven bi-weekly servicing of the traps. This is good news for agricultural producers in New York State as we can assure other states and nations that we monitored for these pests and our findings indicate that there is no risk of our exporting invasive species with our agricultural products.

Efficient Vineyard – The loaner sensor program continued in 2018 with 5 growers scanning 310 acres. The loaner sensor program is provided at no cost to the grower as part of the USDA/NIFA SCRI project “Efficient Vineyard”. A member of the LERGP extension team will come out to the vineyard, install the sensor, train the operator on turning the machine on



and off, and when the scan is completed will come back to remove the equipment. After scanning their vineyards, participants receive a map that provides an indication of relative vine size. While the map does not provide the actual vine size (unless pruning weights are taken to calibrate the scan) it does provide an indication of areas where vine size is smaller relative to the other vines in the vineyard. As shown in Figure 1, areas of blue have larger vine size relative to areas of red and yellow. Focusing in on the red and yellow areas allows you to identify trouble spots in a vineyard and troubleshoot what might be limiting vine size in those areas. It is then easier to make an informed decision on whether it is economically feasible to manage that area differently. If you are interested in participating in the loaner sensor program in 2019 give the LERGP extension team a call at (716)792-2800. This project is funded by USDA/NIFA Specialty Crop Research Initiative.

Video Podcasts and Facebook – The LERGP Extension team continues to produce and post weekly video podcasts on a variety of subject areas from crop estimation to late season weed management. The podcasts have been especially useful in getting the word out on Spotted Lanternfly, the latest invasive species posing a threat to our grape industry. At the time of this writing the team is up to 96 podcasts that can be found at <https://lergp.com/podcasts>. Check out the program on the CLEREL Facebook page and you will find a cornucopia of information from food safety at Thanksgiving and webinars on topics important to growers to the Vineyard Improvement Program and items of general interest like wrapping bee hives for winter. Like us on Facebook at <https://www.facebook.com/Cornell-Lake-Erie-Research-and-Extension-Laboratory-678754995584587/>

Spotted Lanternfly – Members of the Lake Erie Regional Grape Program are closely monitoring the effects of Spotted Lanternfly (SLF) on grapes as well as their movement from their current infestations down in southeastern PA. While no life stage of the Spotted Lanternfly will bite humans or animals, it is a sap feeder that pulls the sugar rich fluid directly from the phloem of the plant. Adults are approximately 1-inch in length and can cover a vine when feeding in the fall. Grape growers in Southeast Pennsylvania have found this pest to be swarm feeders with over 300 adults seen feeding on a single grapevine. This type of feeding can severely weaken the vine making it more susceptible to attack by other pests as well as compromising its winter hardiness.

This invasive planthopper is an excellent hitchhiker and moves primarily through human activity. First reported in Berks County, PA in 2014 and since that time, it has become established in 13 counties in Pennsylvania, 3 in New Jersey and one in Virginia. In 2018, Spotted Lanternfly was found in eight New York counties; Albany, Chemung, Delaware, King, Monroe, New York, Suffolk, and Yates. There is only one generation per year and from fall into winter the primary life stage to be concerned about, is the egg mass. Each female can lay up to two egg masses, each containing 30 – 50 eggs. Egg masses can be laid on almost any surface although smooth, flat surfaces and rusty metal appear to be preferred by the female SLF. If you are planning to visit the quarantine zone in Southeast PA, or have people coming up to visit you from that region, the NYS IPM Program has produced a handy checklist to help in the identification of the various life stages of SLF and the items that should be inspected before leaving the quarantine zone. The New York State Department of Agriculture and Markets has implemented an external quarantine that will restrict the movement of certain goods brought into New York from Delaware, New Jersey, Pennsylvania and Virginia, states currently with SLF infestations.

To help slow the spread of SLF into New York, the [quarantine](#) requires certificates of inspection issued from the impacted states on the following regulated articles entering New York State:

- Any living life stage of the SLF.
- Brush, debris, bark, or yard waste.



- Landscaping, remodeling, or construction waste.
- Logs, stumps, or any tree parts.
- Firewood of any species.
- Packing materials, such as wood crates or boxes.
- All plants and plant parts, including but not limited to nursery stock, green lumber, fruit and produce and other material living, dead, cut, fallen (including stumps), roots, branches, mulch, and composted and uncomposted chips.
- Outdoor household articles, including, but not limited to, recreational vehicles, lawn tractors and mowers, mower decks, grills, grill and furniture covers, tarps, mobile homes, tile, stone, deck boards, mobile fire pits, and any equipment associated with these items, and trucks or vehicles not stored indoors.
- Any other article, commodity, item, or product that has or that is reasonably believed to be infested with or harboring SLF.

New York's order requires travelers transporting any of the above items to have documentation listing the origin and destination of shipments. It also prohibits unnecessary stops while traveling through the quarantine area. The State Department of Agriculture and Markets will operate compliance checks at strategic locations around the State to enforce the regulations.

The State's quarantine order was developed in consultation with representatives from the forest products industry, including manufacturers and harvesters, and nurseries/landscapers, orchard and vineyard owners, and others potentially impacted by the restriction. New York also collaborated with other states where quarantines have been enacted to slow the SLF's spread.

You are encouraged to take an active role in limiting the impact of this invasive pest. If you see Spotted Lanternfly, report it! Take a photo, document the location and send the information to spottedlanternfly@dec.ny.gov

Multiple podcasts about Spotted Lanternfly are available at LERGP.com

Spotted Lanternfly in NY <https://youtu.be/BwWGH1-tBDA?t=4>

Spotted Lanternfly with Erica Smyers, PSU <https://youtu.be/XcSzJM1Em10?t=1>

Spotted Lanternfly Part 4 – Tree of Heaven Scouting https://youtu.be/_dGDolyU5I?t=1

Spotted Lanternfly Part 2 <https://youtu.be/UP5wBAG7yOs>

Spotted Lanternfly February 2018 https://youtu.be/p_AqKcIJ3co

Unwanted guests...SLF <https://youtu.be/TyAbwLFB3ok>

Much more information on Spotted Lanternfly can be found at the NYS IPM Program's Spotted Lanternfly page at <https://nysipm.cornell.edu/environment/invasive-species-exotic-pests/spotted-lanternfly/>



PA Update

Andy Muza, LERGP Extension Team, Penn State Extension- Erie County

Vineyard Scouting Network – 2018 Season Recap of Weather and Diseases in the Lake Erie Region

Andy Muza, LERGP Extension Team/Penn State Extension – Erie County

Bryan Hed, Lake Erie Regional Grape Research and Extension Center, Penn State University

Weather

The following is a recap of weather information from the 2018 Season, which was reported by Bryan Hed in Crop Updates from May – September. The weather data is from the NEWA site at the Lake Erie Regional Grape Research & Extension Center, North East, PA.

May 2018 - May finished out with 4.67” rain and almost 420 growing degree days; much wetter and warmer than average.

June 2018 – The beginning of June (about the first 10 days) was relatively dry but by the end of the month, the rainfall was above average and totaled 3.74”. About 540 growing degree days were accumulated during June (also above average).

July 2018 – July rainfall, at the grape lab in North East, PA, was well below average; 1.74” by the 25th of July. Growing degree day accumulations (about 625 gdds as of 25th of July) marked July 2018 as the hottest July in at least the past 20 years.

August 2018 – Above average precipitation (i.e., 4.02”) was recorded in August. A total of 730 growing degree days were accumulated which ranked as the second hottest August in at least the last 20 years (August 2016 was hotter).

September 2018 - September finished up with 5.01” of rainfall, which was well above the 20 year average of 4.1”. An accumulation of 539 growing degree days (gdds) during September, marked this September as the third warmest in the past 20 years. Looking over the entire growing season, a whopping 2980 gdds were accumulated from May 1st to September 30th. That’s about 491 gdds above our average for the past 19 years!

Vineyard Scouting - Diseases

The following is a recap of scouting information from the 2018 Season which was reported in Crop Updates from May – September.

Vineyard Scouting was conducted weekly at various sites extending from Girard/Lake City area to North East, Pennsylvania. The objective was to provide timely information, throughout the season, on potential/developing pest problems in vineyards. Monitoring of vineyard blocks began on May 3rd and continued until September 20th. Scouting information, along with accompanying photos of pest problems obtained during the weekly monitoring, was reported in the Crop Updates.

Phomopsis

At the start of the 2018 season inoculum levels were moderate - high throughout vineyards in the Lake Erie Region. April was cold and wet but around May 3rd grape buds started to swell in Concord vineyards. Crop Update: 5/3/18 advised growers to, “be prepared to apply a mancozeb



spray as early as 1" shoot growth if an extended period of wet weather was predicted during this stage." Regardless of the weather conditions, a mancozeb application was advised no later than 3" growth stage. On May 9th, 50% bud break occurred in Concords at the grape lab in North East, PA and at this time (south of I-90) shoots were around 1.5". By May 17th, according to NEWA, at least 47 hours of wetness occurred since budbreak with infection events for Phomopsis spanning May 11th to May 15th. By May 24th, Phomopsis leaf lesions were visible on wild grapevines in the region and on May 31st lesions were visible on Concord leaves (Figure 1) and shoots on the first through third internode regions.



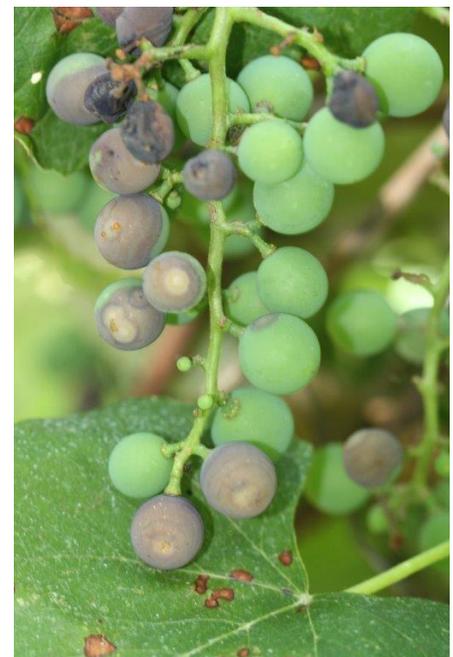
*Figure 1. Phomopsis lesions on Concord leaf.
Photo - Andy Muza, Penn State*

Overall in 2018, the incidence and severity of shoot lesions were less than expected considering wetting periods just after budbreak and the level of inoculum from last season. At the end of the season, rachis and pedicel (berry stem) infections were not as widespread as in the 2017 season. However, depending on management and the site, phomopsis infections could have contributed to some of the shelling of berries that occurred around the region at harvest.

Black Rot (BR)

Black rot had not been a problem in the majority of vineyards in the Lake Erie Region in the last few years, prior to 2018. However, on May 31st, leaf lesions were observed in a Concord vineyard where last year's BR mummies were easy to find in the trellis. Growers were warned that, "if you can find old black rot mummies in the trellis or find leaf lesions now, then you should be particularly concerned about potential fruit infections during the Immediate Prebloom through Early Postbloom periods."

By June 7th, I was seeing scattered leaf lesions in vineyards throughout our area and at one site, where mummies were easy to find in the trellis, leaf lesions were numerous with a number of leaves already plastered. Crop Update: 6/21/18 warned that, **"If you have not yet applied your 1st POSTBLOOM fungicide application then do so as soon as possible.** The 1st POSTBLOOM spray should be applied no later than 14 days, or less if the weather is wet, after the Immediate Prebloom spray. DO NOT stretch spray intervals beyond 14 days during this critical period for protection of the clusters." By July 12th, BR was not hard to find in border areas near the woods in a number of vineyards that I routinely check (Figure 2). At this time, I also began receiving reports from growers concerning black rot infections. Since berries would continue to be susceptible to infections for about another 2 weeks, a fungicide application before the next rainfall was advised in blocks where leaf lesions or infected berries were easy to find. Two weeks later (July 26th) I continued to hear from growers concerning black rot in Concord clusters. Concord berries can still be infected up to 5 - 6 weeks after bloom but at this point Concords were close to the stage



*Figure 2. Concord berries with black rot symptoms.
Photo - Andy Muza, Penn State*



where berries become resistant. However, rainfall events several days prior to July 26th resulted in black rot infection periods. So, if leaf lesions or berry infections were easy to find then an **immediate** fungicide application was advised. Effective fungicide options recommended were DMI materials (FRAC Group 3) such as: tebuconazole products; Rally (myclobutanil); Mettle (tetraconazole); or Rhyme (flutriafol). Research indicates that these DMI fungicides have excellent **post-infection** activity (at least 3 days and potentially longer).

Powdery Mildew (PM)

Prior to May 24th there were at least a couple of PM primary infection periods (0.1" rain, and temperatures above 50F). In the Crop Update: 5/31/18 it was reported that, "powdery mildew was observed on some leaves at a Concord site. In the past, when powdery mildew was found in Concord vineyards this early (before the Immediate Prebloom period) then later berry infections were commonly seen throughout the region. **This serves as a warning**, berries of all varieties are most susceptible to infection from the Immediate Prebloom through Fruit Set period and need to be protected."

On June 14th, powdery mildew was found on a few flower clusters in a Niagara vineyard and by June 21st, small patches of PM lesions were showing up on Concord leaves and young berries scattered throughout vineyards (Figure 3). Bryan Hed indicated in Crop Update: 6/28/18 that, "Concord and Niagara fruit will probably remain relatively clean of powdery mildew if your immediate pre-bloom and



*Figure 3. Powdery mildew on young Concord berry.
Photo - Andy Muza, Penn State*

first post bloom spray included effective, rainfast materials for this disease, you sprayed every row with a well-calibrated sprayer, plenty of water for good coverage, and the interval between those sprays did not exceed 14 days. **ALL THESE FACTORS** are important pieces to an effective fruit protection program, especially under the wet conditions we've had lately."

On August 9th, PM on leaves was low-moderate in vineyards that I checked. However, cupping and yellowing of leaves near shoot tips was evident in Concord vineyards. These symptoms are caused by PM infections and become more noticeable every year about this time. It was emphasized that: 1) the need for late season sprays for PM in Concord vineyards depends on the crop load and amount of PM leaf infections in **your** vineyard(s); and 2) protection needs to be

continued in blocks of *V. vinifera* and highly susceptible hybrid varieties. By August 30th, tiny black dots were appearing on leaves infected with PM. These structures, called chasmothecia in the lingo of plant pathologists, are the overwintering, sexual fruiting bodies of the PM pathogen. Chasmothecia develop in late summer on infected leaves, clusters and shoots and are rain washed onto the bark of grape trunks. Spores, produced within these structures, survive the winter. Next season spores will be discharged from the chasmothecia to initiate primary infections.

Downy Mildew (DM)

In 2017, the dry weather throughout the region in July and August kept the incidence of DM from very low to nonexistent in Concord and Niagara vineyards. Therefore, inoculum levels were low going into the 2018 season.

DM lesions were observed, for the first time on June 20th, on a few leaves in a block of Delaware. On July 12th, despite the dry weather in the previous 2 weeks, DM lesions were still being found



on leaves in this Delaware block and on scattered clusters in a Fredonia block. A few rainfall events prior to July 25th resulted in abundant leaf lesions (Figure 4) in this Delaware block and growers were advised to scout their vineyard blocks to determine if DM was present. Rainfall events in August continued to promote the possibility of DM infections. However, in Concord and Niagara vineyards, only a few DM berries were found all season at sites checked. By the end of August, my only concern for potential problems to occur were at sites with susceptible wine varieties. In Crop Update: 9/13/18, Bryan Hed reported that, "Six inches of rain in the past 4 weeks has generated plenty of downy mildew infection periods and kept the threat of the disease very much alive. With all this rain now, bunch rot is being observed developing in wine varieties with compact bunches and unfortunately, in some cases it's in the form of sour rot."



*Figure 4. Delaware leaf with numerous downy mildew lesions.
Photo - Andy Muza, Penn State*



A sincere and heartfelt wish of a
Happy Thanksgiving and Holiday
season to you and yours from all of us
here at CLEREL!



PA Update

Bryan Hed, Research Technologist, Lake Erie Grape Research and Extension Center

The one constant every year is that every new season is different in some ways from all the others. And when I think of 2018, I think 'California summer'. Since I got into this business almost 20 years ago, the 2018 season sticks out as the hottest season by far. From May 1 to September 30, we recorded almost 3,000 growing degree days (2980 actually) at our location. In contrast, the coldest season since I arrived back in 1999, was 2003 at 2180 gdds. That's a difference of 800 gdds!! I remember that awful year; huge crop, cold, started wet, ended wet, lots of unripe/unharvestable vineyards. In 2018, it seemed everything was happening too fast. For Concord at our location we went from 50% bud break to harvest in less than five months. For Vignoles, the season was *less than* 4 months long! For some of our table grapes, the season was barely three months long. Diseases that depend for development on regular rainfall, like black rot and downy mildew, were relatively easy to control up here around the Erie lake shore. Powdery mildew was in moderate supply in the Lake Erie belt; not light but certainly not of hardcore epidemic proportions. In contrast, to the south, Pennsylvania was dealing with too much rain and a boatload of downy mildew and harvest rots in their wine vineyards. To be fair, we also suffered a lot of sour rots in our wine grapes due to the heat and return of rains in September (five inches of it!). We also suffered a fair amount of fruit cracking and damage from grape berry moth near harvest that led to some serious shelling and crop loss in some area vineyards. And then, on October 11 the weather suddenly took an entirely different turn, and has never looked back.

Here are some of the disease management projects conducted at the Lake Erie Regional Grape Research and Extension Center in North East PA, in 2018.

I. **The mechanization of early leaf removal in Pennsylvania vineyards.**

The cultural practice of fruit zone leaf removal is integrated into wine grape production systems to open the fruit zone to better air, sunlight, and pesticide exposure, and improve control of late season harvest rots. This practice is typically applied just after fruit set, but a more novel timing/approach to fruit rot control, involves the removal of leaves at the beginning of bloom. This earlier timing combines the benefits of an open fruit zone with a reduction in cluster compactness, which plays a large role in fruit rot susceptibility of varieties like Vignoles, Pinot gris, Pinot noir, Chardonnay, and Riesling. For this reason, pre-bloom leaf removal has generally been more effective at bunch rot control than post-fruit-set leaf removal.

Fruit zone leaf removal by hand is a labor intensive, expensive practice. And with the decreasing availability, and rising cost of labor, mechanization of this process is necessary. Over the past four seasons, we evaluated the mechanization of pre and post bloom, fruit zone leaf removal using air-pulse technology (Collard, Blue-line). With this technology, a tractor mounted unit shoots bursts of air (generated by a compressor) into vines to shatter leaves in the fruit zone, with little damage to inflorescences. Pre-bloom leaf removal may also have potential to regulate yields for high-yielding hybrids that often require expensive thinning and to increase brix levels by harvest.

Results: Field trials at the Lake Erie Regional Grape Research and Extension Center (North East PA) and several commercial vineyards in Pennsylvania, have shown that mechanized pre-bloom leaf removal (by air-pulse) can mimic many of the beneficial effects of leaf removal by hand. Trial varieties and trellis systems examined ranged from *Vitis vinifera* (Riesling, Pinot gris, Pinot noir) grown on a vertical shoot positioned trellis (VSP), to French hybrid wine grapes (Vignoles and Seyval grown on four-arm kniffen (4AK) systems; Foch, Vidal, Vignoles, Noiret, and Chancellor grown on high wire



cordon/no tie systems (HWC)) and even *Vitis labrusca* 'Concord'. Mechanized pre-bloom leaf removal efficiency is greatest when applied to more upright, 2-dimensional training systems like VSP and 4AK, than on umbrella type, more 3-dimensional systems like HWC. So far, mechanized leaf removal efficiency has averaged about 43%, 47%, and 35% for VSP, 4AK, and HWC systems, respectively, when compared to hand leaf removal (which was considered 100% in the fruit zone). Cluster weights, the number of berries per cluster, cluster compactness, yields, and bunch rot were all reduced by air-pulse, pre-bloom leaf removal, when compared to an untreated check, though the reductions were not always statistically significant. Pre-bloom mechanized leaf removal also improved light penetration (and probably fungicide penetration?) into the fruit zone. Mechanization can improve the timeliness of this cultural practice, reduce reliance on expensive, often hard-to-find hand labor to conduct this important cultural activity, and reduce reliance on fungicide applications for bunch rot control. This concept works best where vineyard acreage occurs in large concentrations (i.e. the Lake Erie Region) and equipment can be shared or the service can be contracted locally. On the other hand, equipment costs could be prohibitive for small, isolated farms. This project was supported with funding from the PA Wine Marketing and Research Board/PDA.

II. **The evaluation of synthetic and biorational crop protection materials, and foliar fertilizers for grape disease control.**

Four field trials were conducted at the Lake Erie Regional Grape Research and Extension Center to evaluate new fungicides for efficacy, and comparison to existing fungicides and fungicide programs. These evaluations make possible the ongoing expansion/improvement of disease management recommendations to the grape industry by i) increasing the number of options for grape disease control; ii) development of fungicide combinations that could increase biorational inputs and reduce synthetic inputs; iii) helping to delay resistance to, and eventual loss of, riskier synthetic options currently available, and iv) educating extension/research staff that will provide the best/most current management advice to stakeholders and save growers money.

1. Effects of Harvestmore ureamate on powdery mildew, yields, and fruit maturity of Concord grape. If you were wondering about the effects of those Harvestmore sprays you've been applying to your Concord vines, here is some information that may help answer some of your questions. Four treatments were compared: Harvestmore ureamate (HMUM) solo; Standard spray program (SRP); HMUM + SRP; Unsprayed check. Each treatment was applied five times (3 pre and 2 post bloom sprays). Our results from 2017 and 2018 Concord trials suggest that HMUM, as a stand-alone treatment, can provide modest suppression of powdery mildew on Concord fruit and leaves, particularly in early to mid-summer. However, HMUM is best used to *enhance a Standard Rotational Program* of conventional fungicides, with powdery mildew control that is significantly better than a standard rotation of conventional fungicides alone. Cluster weights, pruning weights, and brix were not affected by treatment. This project was supported by Stoller USA.

2. Evaluation of fungicides for control of black rot, powdery mildew, and Phomopsis of Concord grapes. Our objectives were i) to evaluate the efficacy of two rates of a new Group 7 (succinate dehydrogenase inhibitors) fungicide, Miravis Prime for control of black rot fruit rot, Phomopsis cane spot, and powdery mildew, and ii) compare its efficacy to some existing materials for these diseases (Luna Experience, Endura). Luna Experience and Miravis Prime provided complete control of black rot fruit infections. The SDHI chemistry in Endura (boscalid), on the other hand, appears to have little or no activity against black rot. All treatments were effective at controlling powdery mildew on fruit, but Miravis Prime and Luna Experience appeared to perform better than Endura in terms of limiting the incidence of clusters with fruit infections. Miravis Prime and Luna Experience also appeared to show some activity against Phomopsis infections on shoots. However, this activity was much more limited (suppression?) than that observed against black rot and powdery



mildew. This project was supported by Syngenta.

3. Evaluation of fungicides for control of downy mildew of Chancellor grapes.

Our objectives were to i) compare the efficacy of two biorational fungicides, Lifegard and Zonix (applied every 10 days) to known standards (Manzate Prostick and Ziram) applied every 14 days, for grape downy mildew control, and ii) evaluate Lifegard and Zonix as rotational and tank mix partners with Manzate Prostick. Downy mildew development was *atypical* in the trial and fruit disease was not observed until near the end of July when fruit were considered resistant to direct infection and were nearing full size. Nevertheless, all spray programs were timed to provide protection during this entire period. Solo programs of Lifegard and Zonix failed to provide any reduction in disease. These results stand in contrast to the good downy mildew control achieved in several trials with Lifegard at the Cornell lab in Geneva NY. However, rotational or tank mix programs of Manzate Prostick with either Lifegard or Zonix, provided nearly complete control in most cases, equivalent to a typical conventional program of Manzate Prostick, followed by Ziram. The trial will be repeated in 2019. This project was supported with funding from the Lake Erie Grape Program/NYWGF.

4. Evaluation of fungicides for control of bunch/sour rot of Vignoles grapes.

Our objective was to evaluate and compare the efficacy of a standard chemical fungicide program (rotation of Endura and Rovral), Miravis Prime (a new fungicide labeled for *Botrytis* control), and an unsprayed check. The relatively warm temperatures and abundant rainfall during ripening were very conducive to the development of non-*Botrytis* bunch and sour rots and disease pressure during the final weeks of the season was heavy (nearly a third of the crop was lost to late season rots in the check). A total rot assessment was conducted about 11 days after the final spray, with the following results: i) much of the bunch rot in 2018 was caused by non-*Botrytis* fungi and bacteria (which may help to explain why control levels with *Botrytis*-specific fungicides were low) and ii) both Miravis Prime and the standard *Botrytis* programs provided significant control of bunch rot severity. This project was supported with funding from the PSU College of Ag Sciences.

III. Survey for grapevine leafroll viruses in Pennsylvania.

A statewide survey of Pennsylvania wine grape vineyards for grapevine leafroll viruses (GLRaVs) has been completed. These viruses are known to reduce yields, fruit/wine quality, and cold hardiness in other parts of the world. The survey focused on four varieties of *Vitis vinifera* (Chardonnay, Riesling, Cabernet Franc, and Pinot Noir) and one *Vitis* interspecific hybrid (Chambourcin) and has established that these viruses are widespread in vineyards across the Commonwealth. Therefore further study is planned to determine i) the impacts of GLRaVs on grape quality and productivity in Pennsylvania, and ii) how to mitigate the economic impact of GLRaVs on the PA wine industry. This project was supported with funding from the PA Wine Marketing and Research Board/PDA.

Lastly, I would like to mention 3 student projects conducted at LERGREC this summer by undergraduates at the Penn State Behrend College. Funding came from the Behrend College, Sea Grant, and the PSU College of Ag Sciences.

Kara Dobson, has been compiling and summarizing daily weather data collected at our location since 1948. Her efforts have shown that the change in the climate in North East over the past 70 years has measurable effects for the surrounding ecosystem and the grape-growing industry. She recently presented her research project, *Climate Change in North East, Pennsylvania*, at the 14th Annual Symposium of the Regional Science Consortium at the Tom Ridge Environmental Center in Erie for which she won best poster presentation. Some of her conclusions so far include, i) winter becoming shorter, with first frost in the fall increasing (becoming later) at a faster rate than the last frost in



the spring is becoming earlier; ii) The total number of gdds for the year increasing, showing the climate is gradually becoming warmer with every year; iii) grape bloom dates beginning earlier with each year.

Jessica Till has been studying and taking measurements on our hardy kiwi vines and has discovered a pathogen not yet recorded on that species. Jess is also conducting ELISA tests in our lab for grapevine leafroll virus, assisting Bryan Hed with that project to survey PA vineyards for the presence of these viruses.

Emily Dobry has been studying our row of chestnut trees here at the lab and has discovered a pathogenic fungus that has only been recorded in the Eastern hemisphere and which induces symptoms resembling those of chestnut blight. She was recently asked to present her findings, *Isolation of Gnomoniopsis smithogilvyi from trees of Castanea dentata exhibiting atypical cankers* to the American Chestnut Society NE-1333 Multistate Research Project meeting held at University Park on September 6-9, 2018.

A special thank you to all who hosted our Coffee Pot meetings
this growing season!



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Have you attended one of our coffee pot meetings?

They are informal gatherings of area grape growers and Extension staff where pertinent and timely topics are discussed. There is no agenda, just open forum discussion, networking and a good donut and cup of coffee amongst friends.

Do you have an interest in hosting a coffee pot meeting in 2019? We are always very appreciative of those who open their barn doors for us to have a gathering place. Please call or e-mail me (Katie) if you are willing to host in 2019.

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kjr45@cornell.edu

I am looking forward to hearing from you!



PA Update

Jody Timer, Entomology, Lake Erie Grape Research and Extension Center

Trapping data from 22 traps throughout the North East area indicated that the Grape Berry moth (GBM) population was above average this season, especially in August and September. First generation numbers were low, but the warm weather caused degree days to accumulate rapidly. This made the later generations appear earlier and the damage from the 4th generation appear before harvest. Spotted wing drosophila (SWD) trapping data over the past seven years continue to show SWD emerging earlier each year, increasing in numbers, and overwintering in this region. Research on a variety of grape cultivars showed that SWD was present at the end of the season in all varieties tested, with the exception of the wild native grape. This research also concluded that SWD prefer ripe fruit and rarely attack grapes before veraison. Further experiments have shown that SWD are capable of transferring late season rots to healthy grape bunches. Preliminary results of insect spray residual over the last two years indicates that Leverage 360 has the longest acting residual against this insect.

The Brown Marmorated stink bug (BMSB) trapping over the last five years suggests that their presence in the area is increasing annually, with a greater escalation this season. Although prior research has shown that they are capable of surviving on a diet consisting entirely of grapes, grapes do not appear to be one of their preferred hosts. This year we found BMSB damage in some Concords. The wounds which were discovered before veraison appeared to have scarred over. Wine growers should continue to scout for their presences because they are capable of damaging fruit which creates pathways for late season rots. Research on their defensive odor affecting wine taste continues.

Spotted Lanternfly is a serious pest of grapes. We have banded tree of heaven in the area to ensure that it is not present in this area. At the present time, it remains confined to thirteen quarantined counties in Pennsylvania with insects found in NY, NJ, MD, VA and DE counties that boarder PA.

We are completing three years of research to determine if an optimal insecticide and fungicide spray program applied to extremely high-pressure vineyards can reduce insect and disease injury to acceptable threshold levels. We are also examining the economic feasibility of such a spray program. Preliminary results from this spray program showed a 60%-75% reduction in insect and disease damage at the vineyard edges and an 80-90% reduction in GBM damage in the vineyards' interior. We have also completed a second year of residual testing of insecticides against SWD and grape berry moth. Bioassays with these spray materials were conducted 2 hours, 3 days, 5 days, 7 days and 10 days after each spray application. Preliminary results show that none of the 12 insecticides tested will kill adult grape berry moth. Other insecticides showed promise against grape berry moth larvae and against SWD.

Dates to Note:



December Holiday Break- CLEREL Closed-
December 24, 2018- January 1, 2019



Reporting Session: Tuesday, February 12, 2019 @ CLEREL

2018 Winter Grower Conference: Wednesday, March 13, 2019 @ SUNY Fredonia

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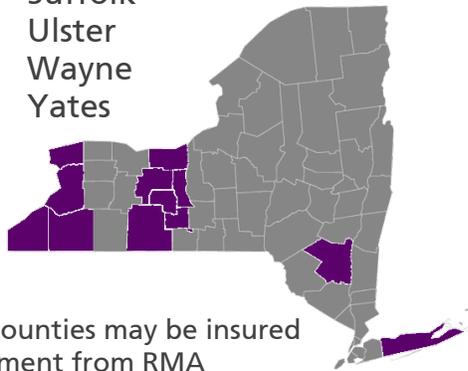
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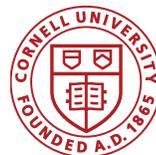
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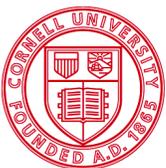
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