The Lake Erie Regional Grape Program

Vineyard Notes- August 2018

Veraison in CLEREL Vineyard
photo, Kim Knappenberger

Lake Erie Regional Grape Program

Cornell University
Cooperative Extension

Building Strong and Vibrant New York Communities

Business Management

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

Cost of Variable Rate Technology Equipment

Basics

For the efficient vineyard project, we have borrowed a lot of things, including technology from field crops and philosophy from outgoing federal reserve chairman Janet Yellen. Previous policy was informed by expectations, history and experience. Yellen took the Reserve down a different path, one that is "informed by incoming data". While history, experience and future expectations remain important, we now have an opportunity to follow the philosophy of "data dependent decision-making". This means that growers still make decisions but those decisions are informed by data. If data is going to improve outcomes we need good data. We also need to know how much it costs to get good data. For us that means, at a minimum, three pieces of technology and accessories:

- A sensor
  - Active Multispectral sensor $4,150 (Crop Circle, Optrix, etc.)
- Data Logger
  - GeoScout X: $1,400
- GPS
  - Basic GPS included with GeoScout
- Cables
  - $335

At its most basic level the hardware will cost $5,885. For growers fewer than 200 acres and/or growers with few employees this might be the right place to begin gathering data. For growers with high labor costs and manually intensive practices, this system would be adequate. Such a grower might add a higher quality GPS and a few handheld units to assist in communicating location and management strategy to employees.

Many growers, rather than buying this system, take advantage of the free loaner sensor program through LERGP. Once comfortable with data patterns and data based decision-making, the primary motivation to invest in the technology becomes the ability to automate sub-block management. Growers want to track employees that are completing variable rate and non-variable rate tasks. Larger growers also seek sprayers and fertilizer spreaders that do not require constant ground speed and calibration. To execute variable rate management, though, growers still need data.

- A sensor
  - NDVI sensor $2,900
- Field Computer
  - Ag Leader 1200 or similar: $5,500
- GPS
  - Basic GPS $100
  - Advanced GPS $2,800+

NDVI sensor

- Cables
    - $300 - $500
- Software
    - $1,000
- Flow controllers
    - $750 - $1,600 per attachment

GPS unit

For $9,000 - $11,000 Ag Leader and Trimble offer fairly basic systems.
Particularly when spending closer to $11,000, these systems are highly upgradable and offer tools to mechanize variable rate management as well as labor/fleet management.

Variable Rate Practices
A grower can easily move GPS and tractor computers from one tractor or harvester to another. In one part of the season it can be used for gathering NDVI data and in another part of the season it can be used for variable rate thinning or variable rate fertilizer. Flow controller would be necessary for each mechanized variable rate implement. The cost of those controllers would vary based on the number of controllers necessary, the amount of flow, and the type of controller. If variable rate control is desired any hydraulic motor or water flow can be controlled through variable rate technology for less than $3,000 including the cost of dealer install.

A few popular production practices are not always powered by hydraulic motors but conversions are possible. A grower converting a fertilizer spreader from a ground or PTO driven chain to hydraulic would need to spend about $4,000. Growers that hire dealers to do the conversion would probably spend about $6,000. This would include the cost of variable rate control. Conversions are fairly unusual so costs are approximate. These systems are usually purchased when a grower upgrades to a new fertilizer spreader. Total cost of a new "smart" fertilizer spreader would be $13,000 - $15,000.

The commercial availability of shoot thinning devices is questionable. The Oxbo shoot thinner added $2,500 - $3,000 to the Oxbo V-Mech system cost. Purchase of the whole system was $25,000 and rose to nearly $40,000 before the line was sold to Mid-west grower supply. Further developments are being made to the line before new systems are sold. A grower or equipment dealer that reengineered a shoot thinning device could easily build a unit for less than $3,000 if the system was mounted to an existing tool arm. Variable rate control would add an additional $2,100 for a total of $5,100.

Costs of other sensors
The commercially available yield monitor from Ag Leader is a modified impact plate that is essentially a load cell. It is available as an option on new Oxbo grape harvesters. The cost of this equipment on a new harvester is approximately $7,000 for the sensor. A display and GPS would add another $7,500 to the cost if the grower needed a stand-alone unit.

Another yield monitor is available from ATV. This Australian yield monitor uses load cells and requires significant modification of the discharge conveyor. Installed the cost of this system is approximately $17,000. Data is owned and processed by ATV in the dormant season.

variable rate shoot thinning

Gregoire will be releasing a yield monitor. It appears to be available as they roll out their new line of harvesters. For 2018 only GLS 7 and 8 harvesters with dual bins were equipped with yield monitors. By 2020 Gregoire expects all GLS 7 and 8 models to have an optional yield monitor. Development of the G9 is a bit slower due to lower international volumes but will likely have yield monitoring technology when it is updated.

Soil EC and NDVI

A brix monitor for logging and mapping brix at harvest is currently in development. The cost of the system is largely unknown. It's possible that the monitor would integrate with existing tractor computers or data logging technology. This would substantially lower the cost of adoption.
Current research is focused on very high quality brix monitors designed for industrial applications. The current cost of a sensor and display are approximately $9,500 - $14,500. Customized mechanical hardware is in the experimental phase but will add cost. If a sensor is developed specifically for agriculture that integrates with Ag specific technology, we could see the cost of the sensor drop by 50% - 90%.

Soil EC mapping identifies soil types and can be used to layer over other data to help identify a source of variability. It may also assist in variable rate fertilizer prescription maps. These sensors with data loggers start at around $15,000. More sophisticated EC sensors can increase cost to nearly $30,000. We've identified EC as the most likely candidate for shared resources and/or consultant services. Just a few sensors could fill the needs of the entire region at a cost of $20 - $40 per acre.

Carnegie Mellon University is working to develop a hq stereo camera sensor. The sensor is not commercially available but has a target price of $30,000 or less. With no commercial partner yet identified, there is a high risk that there will not be widespread adoption for at least five years. The higher purchase price will probably not help some sectors of the grape industry adopt the technology. The promise in the technology is the reliance on software. If it can see it, it can be taught to count it. When applied to a 3-D world, certain limitations do arise but it does offer a possible solution that could replace multiple sensors.

Where to start?
Once you become familiar with the technology and develop a plan for realistic adoption that will provide actionable data, the technology that each operation should purchase may be slightly different. At this time NDVI and yield provide the most actionable data. With these two sensors and georeferenced data it is possible to map crop load.

For growers that own modern harvesters that are upgraded with yield monitors it probably makes the most sense to upgrade the harvester to have variable rate thinning capabilities. Once data is gathered for a couple of years the grower can identify what variable rate technology is most important to them. If the grower does start with these sensors, a variable rate fruit thinning upgrade to a harvester would be the least expensive practice to implement.

Extension Services
Both extension and consulting services are important to the implementation of variable rate management. Data processing and management have the potential to add moderately or significantly to the cost of variable rate management. In future articles we can discuss the costs of data management and processing. At this stage of the project we continue to work toward decreasing those costs.
The economics of sensor technology rest on the benefits of actionable data. Field crops had decades of data that many growers never acted upon. Efficient Vineyard is focused on trials in commercial vineyards to show real-

world impacts of variable rate technology.

This costs how much?

A 200-acre grower is going to end up with quite a bit of technology if the eventual goal is to variable rate all practices. The grower will have around $10,000 invested in canopy and yield sensors. The grower would also have another $4,000 in consulting fees to obtain soil sensor data. Total cost $14,000 (plus whatever the cost a brix monitor ends up at).

The grower will have equipment upgrades the allow for variable rate control as well as the variable rate controllers on a fertilizer spreader, grape harvester a shoot thinner and perhaps eventually a fungicide sprayer. Total cost $13,900.

The grower then needs to buy the brains. The most expensive tractor computers come with unlocked features and can interchangeably accomplish any task. An Ag Leader 1200, for example, could log data today and fruit thin tomorrow. A simple data logger, would be limited in scope but allow a grower to inexpensively log data with one tractor while another tractor thins shoots. In all a grower is likely to spend $14,000 on data loggers and field computers. This would give the grower at least one data logger and two field computers. Total cost $14,000.

The grower also needs GPS. While field computers are interchangeable, the intermixing of branded products is still basically impossible. This does increase the cost of GPS. For a grower that decided to have two field computers and a data logger, he'd likely have two high quality GPS units and one inexpensive GPS. Total cost $6,000.

Equipment Description	Upfront Cost	Per Acre Consultant
Basic Canopy Sensor	$5,885	$5 - $10
Variable Rate Ready Canopy	9800	$5 - $10
Yield Oxbo	$7,000	$5 or less
Yield Gregoire	0	$5 or less
Yield AVT	$17,000	$5 or less
Soil Sensor	$18,000	$5 - $15
CMU Stereo Camera Sensor	$30,000	$50+
Brix	$14,500	NA
Shoot Thinning	$5,100	NA
Fruit Thinning	$2,800	NA
Fertilizer	$6,000	$5

Cost includes hardware and consultant labor for gathering data. Costs do not include data processing.

Canopy Sensors
Yield Sensors
Other Sensors
Variable Rate Equipment

Total hardware cost of converting a vineyard into an efficient vineyard: Up to $48,000. We fully expect the adoption of all practices to either be phased in over time or perhaps a grower would stick with a few variable rate components and never adopt others. It might be realistic to substantially decrease vine size variability and increase yield potential for less than $35,000.

A very special thank you goes out to all of the growers who helped us by hosting a Coffee pot meeting this year. It was another successful season due to the cooperation and willingness of all of you. We look forward to another successful season next year.

Please contact me if you are willing to host a coffee pot meeting in the 2019 growing season.
Katie:716-792-2800 or kjr45@cornell.edu

IPM

Tim Weigle, NYSIPM, Cornell University, LERGP Team Leader

Webinar Series Promotes Precision Viticulture

Members of the Lake Erie Regional Grape Program have been working for the past three years as part of a multi-state, multidisciplinary project looking at developing and implementing precision viticulture practices in New York and California vineyards. As "Efficient Vineyard", a Specialty Crop Research Initiative project funded by USDA/NIFA and headed up by project director, Dr. Terry Bates, moves toward the end of its third year, there is some great research information to dispense to growers and members of the grape industry. One of the objectives of this project is to provide access to project information to grape growers and members of the various grape industries across the United States. To get the word out, members of the Technology Adoption and Outreach team have developed a monthly webinar series, "*A Hitchhiker's Guide to Precision Viticulture*". These webinars are being produced and delivered on the second Tuesday of every month with Jackie Dresser, Cornell Research, and Kevin Martin, LERGP Extension, teaming up to help growers, extension specialists, consultants and members of the grape industry through the ins and outs of precision viticulture. Participants of the webinar series will start by learning the science behind precision viticulture and continue each month, working towards an understanding of the nuts and bolts of implementing variable rate management in a vineyard.

Kevin Martin, Jackie Dresser and Kim Knappenberger (L to R) of the Lake Erie Regional Grape Program incorporate a number of information transfer tools into each Efficient Vineyard webinar.

The webinar series started on June 12, 2018 with a webinar providing background and scope for the rest of the webinar series and on how applying precision viticulture can take the guess work out of vineyard management. Economics of how investing in precision viticulture can increase profitability was also covered. Economics is a key factor in the decision to adopt precision viticulture practices and will be a discussion point in each webinar in the series. Soil was the focus of the July webinar "*Looking Deeper; a subsurface vineyard exploration*" where Jackie discussed the role of soil in nutrient and water availability and how precision viticulture can help growers adapt some cultural practices to a specific soil environment. The latest webinar, "*Does your photosynthetic engine need a tune up?*" looks at how to maximize the photosynthetic efficiency of the grape canopy, and how sensors collect the data to provide growers information on vine size variability within a vineyard.

The fourth webinar, "*How Much fruit would a grape harvester pick if a grape harvester could pick fruit? The low down on yield monitoring in vineyards*" is scheduled for September 11 at 1 PM EST. This webinar will provide participants a

look at how commercially available yield monitors work and how yield data can be mapped in real time and post-harvest.

Participation in the webinar series is available, free of charge, to anyone interested in precision viticulture. To participate, just register for the webinars on the Efficient Vineyard website. To ensure participants do not forget, a reminder email is sent the day before the webinar. The best way to view the webinar is to participate live as there is the opportunity to interact with presenters and fellow participants during a chat time prior to the start of the webinar as well as the ability to ask questions of the presenters during the question and answer period at the end. However, for those who are unable to attend, each webinar is recorded and can be accessed at any time on the Efficient Vineyard website. Webinar registration and viewing of previous webinars can be accomplished at https://www.efficientvineyard.com/ by clicking on the Webinar Info button.

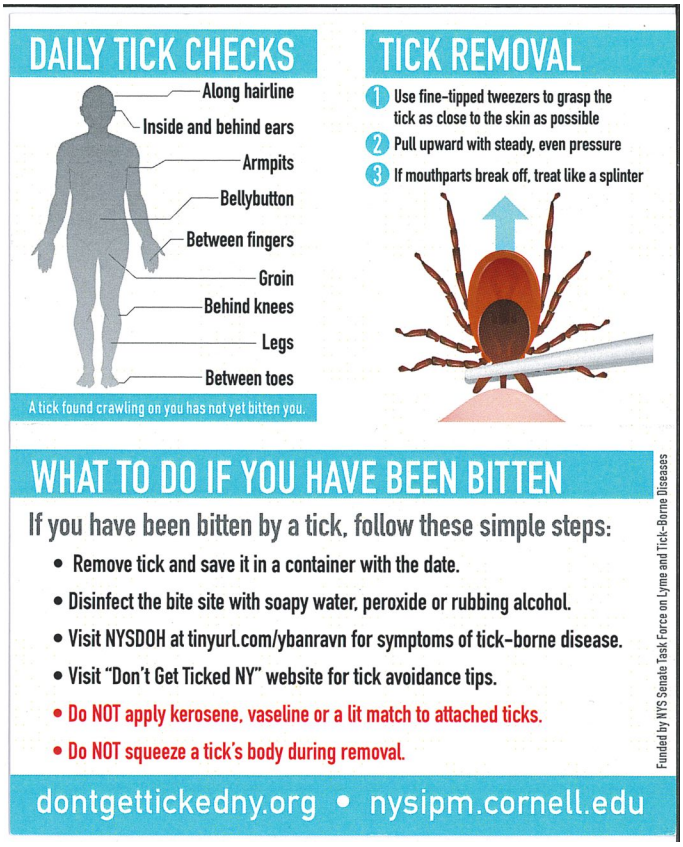
Farmer Tick Survey, 2018 – From the NYS IPM Program

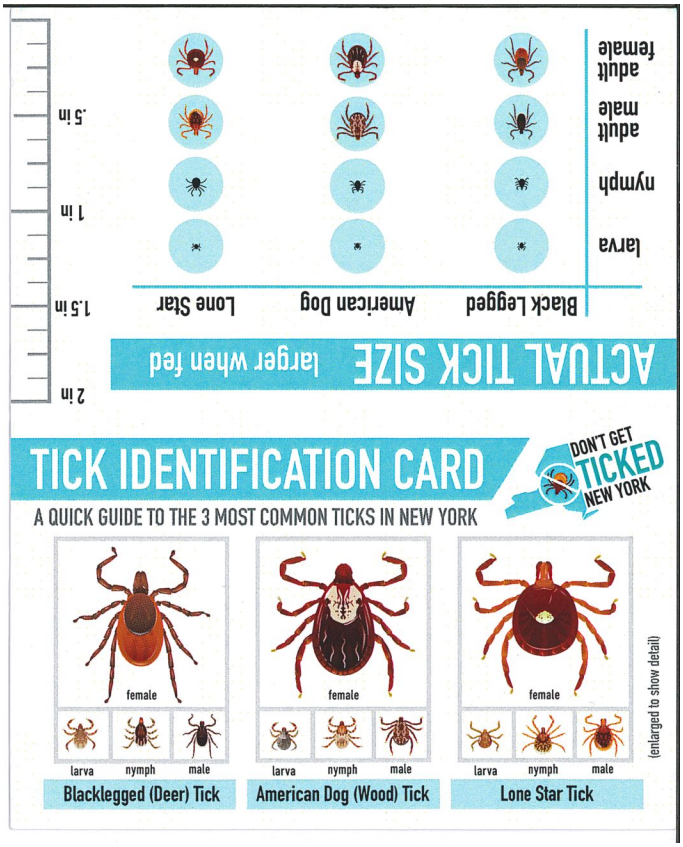
(editor's note: Ticks are becoming a major issue in both agricultural and community settings. Please take a moment to fill out the survey so we can make sure that the impact of ticks in the agricultural setting is well represented in the responses).

The Community IPM Program (part of NYSIPM) was funded by the NY State Senate Task Force on Lyme and Tick Borne Disease to create an educational campaign about the risks of tick exposure and tick awareness for New York. Community IPM addresses non-agricultural pest issues for every New York resident, including farmers. This survey is a research project to help us understand what tick issues and concerns NY farmers are facing on their farms and home properties. By completing this survey you are agreeing to participate in this research. Your answers are completely anonymous and will help us understand how serious the issue is and how to raise awareness with the farming community.

For more information about this survey or about ticks and tick prevention or control, please contact Jody Gangloff-Kaufmann at jlg23@cornell.edu .

Please fill out the survey (just 10 questions!) here: https://tinyurl.com/yc7rnd6r





Where Do We Stand With Grape Berry Moth?

At this point in the season the grape berry moth model on NEWA is no longer accurate in predicting the timing of the next generation and helping to determine the need to apply an insecticide. The reason for this is the overlap of generations that we see this late in the season. The decision as to whether or not additional insecticide applications are necessary should be made by taking the following points into consideration;

- The history of GBM damage in the block
- The risk of increased rots associated with GBM damage
- The economics of the situation (i.e. is this a block with grapes that will be hanging late into the season putting them at a higher risk for damage by GBM?)

NEWA Location	2018 Wild grape bloom date*	DD Total on August 23, 2018	DD total on August 24, 2017	2017 Wild grape bloom date*
Versailles	May 29, 2018	2002	1975	May 28
Hanover	May 29, 2018	2055	1653	
Sheridan	May 28, 2018	2133	1975	May 28
Silver Creek	May 31, 2018	1993	1912	May 31
Dunkirk Airport	May 30, 2018	2031	1863	June 1
Forestville	May 30, 2018	2037		
East Fredonia	May 29, 2018	2039		
Fredonia	May 30, 2018	1975		
Portland Escarp.	May 29, 2018	2061	1933	May 28
Portland	May 30, 2018	2045	1949	May 29
East Westfield	May 30, 2018	2014		
Westfield	May 30, 2018	2045	2009	May 28
Ripley	May 29, 2018	2116	2009	May 28
Ripley Escarp	May 29, 2018	2093		
North East Escarp	May 29, 2018	2048	1948	May 27
Harborcreek	May 29, 2018	2114	1993	May 28
North East Lab	May 30, 2018	2127	2026	May 29
Erie Airport	May 27, 2018	2315	2066	May 26
Lake City	May 29, 2018	2118		
Ransomville	May 30, 2018	2102	1850	June 3
Burt	June 1, 2018	1923		
Somerset	May 31, 2018	Offline	1759	June 8
Corwin	May 31, 2018	1982		
North Appleton	June 3, 2018	1886	1614	June 11
*** Estimated date provided by NEWA website**				

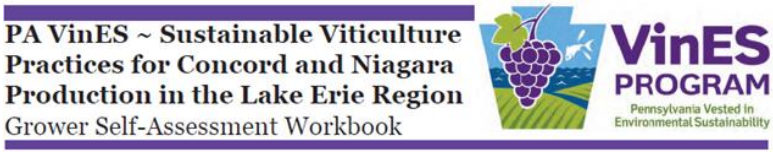
To give a little perspective on where we are in degree-day accumulation compared to last year, check out the chart. There are two things that should be apparent: 1) we are tracking up to 9 days ahead of last year in DD accumulation with the GBM model (using an average accumulation of 26 DD per day) and 2) there are a number of new stations that have been added this year to the NEWA network in the Lake Erie Region due to project funding by National Grape Cooperative, Constellation Brands and Walker's Fruit Basket.

PA Update

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

PA VinES Funding Opportunities for Erie County, Pennsylvania Grape Growers

At this point in the season, Concord growers may have more time on their hands as they wait for harvest season to begin. Now is a good time for Erie County, PA growers to investigate PA VinES Funding Opportunities available from the Erie County Conservation District.



What is PA VinES ? PA VinES (Pennsylvania Vested in Environmental Sustainability) is a workbook that was developed to provide juice grape growers in the Lake Erie Region a method to self-assess practices in their vineyard operation in order to optimize the productivity of their vineyard blocks while ensuring minimal negative impacts to the environment. An economic component is also included which portrays the financial reality that exists when attempting to adopt practices that are both environmentally friendly and economically viable. Implementation of some practices that are least detrimental to the environment may also be the most expensive to the grower. Therefore, it is critical that monetary incentives are provided for farmers to reduce their financial burden while encouraging adoption of environmentally sound practices.

The creation of the PA VinES workbook is a result of collaborative efforts between the Pennsylvania Department of Environmental Protection, Erie County Conservation District, U.S. Department of Agriculture Natural Resources Conservation Service, Pennsylvania Farm Bureau (Erie County) and extension educators and staff from Penn State and Cornell Universities to promote and foster improved soil and water quality conditions within the Lake Erie watershed.

The format of PA VinES and major portions of the content are directly from New York's VineBALANCE workbook. However, PA VinES was adapted to be more relevant to Concord and Niagara production in established vineyards in the Lake Erie Region. *The workbook consists of **7 sections** which include:* 1. *Vineyard Soil and Erosion Management*; 2. *Nutrition Management*; 3. *Vineyard Management*; 4. *Weed Management*; 5. *Integrated Pest Management*; 6. *Pesticide Management*; and 7. *Continuing Education*.

The PA VinES workbook enables juice grape growers to critically evaluate their current vineyard management and provide goals to improve farming practices which prove beneficial in promoting a healthy Lake Erie for generations to come. Following the completion of the PA VinES Self-Assessment Workbook and creation of an action plan, growers may apply for grant funds administered by the Erie County Conservation District. These funds will go toward the implementation of Best Management Practices (BMP's) that reduce nitrogen, phosphorus and sediment loading in the Lake Erie Watershed.

To find out more about PA VinES Funding Opportunities contact: Erie County Conservation District, 1927 Wager Road, Erie, PA 16509 **Phone**: 814-825-6403
Email: Ryan Nageotte at rnageotte@erieconservation.com OR
Bethany Fritz at bfritz@erieconservation.com

E. Smyers

Identification

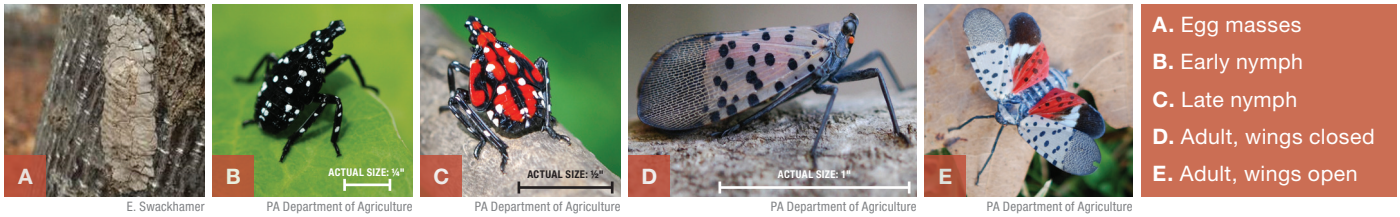
The spotted lanternfly (SLF) is an invasive sap-feeding planthopper found in southern Pennsylvania. It is native to China and was found in Pennsylvania in 2014. Tree-of-heaven, an invasive plant, is the preferred host for SLF, but SLF also feeds voraciously on grapevines (wild and cultivated), tree fruit, and various hardwoods. Eggs are laid in masses on any solid surface (trees, posts, stones, buildings, etc.) in the fall. They hatch in the spring and go through four nymphal instars. Adults emerge in mid- to late July and die with the onset of winter. Both nymphs and adults have been observed feeding on grapevine.

Damage

SLF is a phloem feeder, similar to leafhoppers, aphids, and other pests with piercing-sucking mouthparts. SLF feeds on the vine trunk, shoots, and leaves and can feed through bird netting. SLF excretes large amounts of honeydew, which can cause sooty mold outbreaks on the leaves and fruit. This honeydew may also exacerbate yellow jacket problems. We are still learning about this new invasive pest and don't yet have economic loss estimates for grape. Research is ongoing to develop control measures for this pest and to determine implications for both juice and wine production.

Quarantine

SLF is currently under quarantine in 13 counties in southeastern Pennsylvania (see map). Additional counties may be added to this map. Please check the Pennsylvania Department of Agriculture (PDA) website for the most up-to-date information. If your farm is not within the quarantine zone and you have found SLF, collect or photograph the specimen and report it immediately using our online reporting form at **extension.psu.edu/spotted-lanternfly** or by calling 1-888-4BAD-FLY. Permits are required for businesses that transport materials within the quarantine area. The permits are designed to indicate that you are aware of SLF and are following procedures to prevent spreading the pest from one location to another. For more information on permitting, see the PDA spotted lanternfly webpage. If you are traveling to or from the quarantine zone, check your farm equipment or any other item that has been stored outside for egg masses, nymphs, and adults.



E. Swackhamer PA Department of Agriculture PA Department of Agriculture PA Department of Agriculture PA Department of Agriculture

The life stages of SLF, including an egg mass on a tree, early nymphs, late nymphs, and the adults. Adults with both closed and open wings are shown, though adults with closed wings are more common.

Please take our survey!

Spotted lanternfly (SLF) is a new invasive planthopper currently found in southeastern Pennsylvania. It is similar to leafhoppers, scales, and aphids, which feed on the grapevine trunk, shoots, and leaves. Honeydew excretions from SLF have also caused sooty mold issues in vineyards. We are conducting a grower-focused impact assessment to help us develop research, extension, and education activities. These responses may also be used to support grant proposals for future spotted lanternfly activities. If you are a grape grower or work in the grape industry in Pennsylvania, please complete this survey: https://www.surveymonkey.com/r/SLFGrape. This survey is anonymous and should take 10-15 minutes to complete. The survey will be closed on July 31, 2018.

For more information on SLF, please see the pest alert (attached) or visit our website: https://extension.psu.edu/spotted-lanternfly

Thank you!

Heather Leach, Spotted Lanternfly Extension Coordinator. hll50@psu.edu, 814-863-2872

Lake Erie Regional Grape Research and Extension Center to Host Open House

ERIE, Pa. – The Penn State Lake Erie Regional Grape Research and Extension Center will hold a public open house September 15, 2018.

The applied science and outreach center was founded 66 years ago to help the region's grape growers identify, treat, and prevent agricultural disease and pest infestation. The center also experiments with new growing strategies, additional grape varietals, and potential new fruit crops. The 40-acre facility grows Concord and Niagara grapes and experimental varietals, and is assessing the suitability of the lakeshore microclimate to two novel cold-weather fruits, hardy kiwi and haskap, a type of honeysuckle that bears a fruit similar to the blueberry.

The center's entomologists and plant pathologists conduct research ranging from studying new spray technologies for plant disease and insect control to new techniques for cluster thinning and pheromone attractants. Two weather-reporting systems give growers daily information to support optimal timing for pesticide application; the center's historical weather data also being shared with climate scientists.

Open house visitors are invited to tour the vineyards and learn more about the center's research efforts. The open house takes place from 10 a.m. until 2 p.m. on Saturday, September 15, at the center, located at 662 North Cemetery Road in North East. For additional information, call the Penn State Lake Erie Regional Grape Research and Extension Center at 814-725-4601.

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INSURING GRAPES

NY, 2018

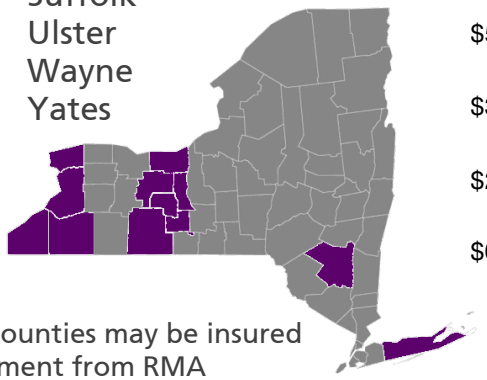
Crop insurance is a safety net for farmers that helps you **manage risk**. If you have a crop failure, crop insurance can help you farm again next year.

Important Insurance Deadlines

- **Nov. 20, 2017:** Sales Closing, Policy Change, Cancellation, Termination Date
- **Jan. 15, 2018:** Acreage / Production Report Date
- **Aug. 15, 2018:** Premium Billing Date
- **Nov. 20, 2018:** End of Insurance Period

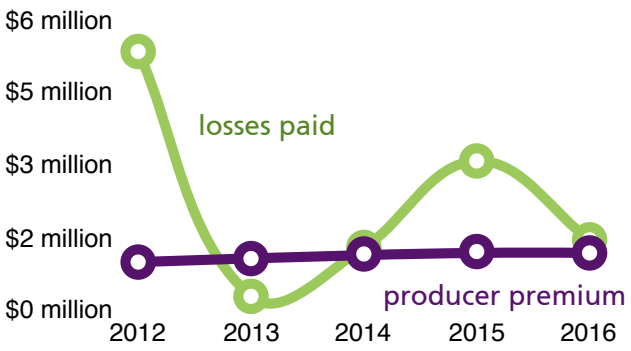
Over 40 grape varieties are insurable in these counties:

Cattaraugus
Chautauqua
Erie
Niagara
Ontario
Schuyler
Seneca
Steuben
Suffolk
Ulster
Wayne
Yates



Grapes in other counties may be insured by written agreement from RMA

NYS Grape Crop Insurance Performance



Learn more & sign up:

To sign up, contact a crop insurance agent. Find an agent using the Agent Locator tool at rma.usda.gov/tools/agent.html

Find crop insurance information at ag-analytics.org/cropinsurance/

Cornell University delivers crop insurance education in New York State in partnership with the USDA Risk Management Agency.

Diversity and Inclusion are a part of Cornell University's heritage. We are an employer and educator recognized for valuing AA/EEO, Protected Veterans, and Individuals with Disabilities.

Ag-Analytics

USDA

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