LERGP Newsletter

December 2016

2016 Harvest Edition

A review of all that was accomplished in 2016

photo credit: R.J. Anderson/Cornell Cooperative Extension

The Lake Erie Regional Grape Program

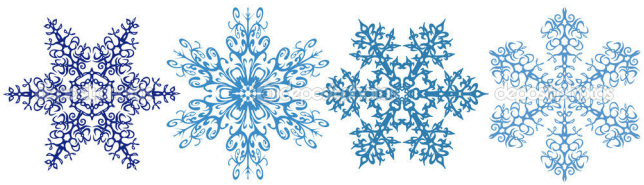
Building Strong and Vibrant New York Communities

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

SAVE THE DATE

2017 LERGP Winter Grape Grower Conference is coming in March-

note the date change!!



The revised date for the conference is
<u>Wednesday, March 15, 2017.</u>

**The Shaulis Symposium has been rescheduled to Summer 2017.

We apologize for any inconvenience this change may cause.

LAKE ERIE REGIONAL GRAPE PROGRAM

2017 GRAPE GROWERS' CONFERENCE REGISTRATION FORM

to be held at SUNY Fredonia Williams Center
on Wednesday, March 15, 2017
Deadline for registration is Friday, March 3, 2017.

Name (1st attendee) _____ **$**_____

Farm Name _____

Address, City, State, Zip Code _____

_____

Phone_____ **E-mail**_____

Are you enrolled in Lake Erie Regional Grape Program (LERGP)? **Yes**_____**No**_____

REGISTRATION FEES	
LERGP Member 1st attendee	$ 50.00
Additional attendee on same farm	$ 40.00
Non- member	$100.00

Additional Attendees:

	$
	$
	$
	$
	$

*Please add a **$25.00 late fee** for each reservation made after March 3, 2017

TOTAL $_____

Please make check payable to **LERGP (Lake Erie Regional Grape Program)** and mail to: (*US funds only*)

Kate Robinson
LERGP
6592 W Main Rd
Portland NY 14769

Name _____NY DEC/PA PDA NUMBER_____

Name _____ NY DEC/PA PDA NUMBER_____

Name _____ NY DEC/PA PDA NUMBER_____

Date Ck. Rec'd	**Amount**

Call Kate at 716-792-2800 ext 202 with any questions.

Page intentionally left blank

Business Management

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

Pruning Labor and Mechanized Pruning

In a pattern that emerged last year, it seems some areas of our grape region are experiencing a moderate surplus in pruning labor. While prices remain relatively high, availability is robust. While this was observed last year, it is complicated by other areas continuing to lack the ability to find adequate labor to meet their seasonal demands. Obviously your management strategy will be dictated by your personal location, or so it appears.

If the trends do hold, surplus availability will disappear on January 1st. Higher prices in areas lacking labor create an incentive for the labor to commute a greater distance. While there is some anecdotal information that supports this trend, it would be nice to know what growers are planning. Having a better understanding of your pruning practices would help in developing a better understanding and recommendations for managing pruning. If you get a chance, please fill out the following web-based survey: **https://goo.gl/forms/wi7mBBcEhChB2fng1**

The management concern that I have revolves around the date of the change. It appears to me that growers may be delaying pruning in order to postpone expenses into a later tax year. While normally it does make sense to level out farm income, using pruning to do so has not been an effective strategy. Labor costs have tended to increase by 7% - 10% in January and February. By March and April pruning costs have increased by 10% - 20% of December pricing. Recent trends support that hand-pruning labor is most cost effective immediately after leaf fall. The ability to delay pruning because of winter temperature concerns is limited to mechanical pruning operations and higher value varieties. It may also continue to be prudent to delay Niagara pruning.

It is possible that a decline in demand is more related to changing farm practices. Though, anecdotally, it does not seem to be the case. I would like to know what your pruning strategy is. I am hopeful we will be able to get enough of a response to help growers plan for short-term and long-term strategies for sustainably and economically pruning their vineyards.

There are a number of other factors that may be driving down the need for labor. For growers that are receiving a lower price, it would be logical to assume more acres have shifted toward mechanized pruning. For growers that have not yet received a lower price, annual meetings have indicated that it is likely those prices will be lower next year. Overall, all growers are being pressured to reduce costs. While mechanized pruning may be one way to do that, I'm just not sure we have observed significantly higher adoption in the last three years.

If there is acreage that is out of production, it is an amount that is not insignificant. The reduction of Cott tonnage contracts has also left a number of acres in a transitional state. Growers who need enough acreage to meet their Cott tonnage contracts, have significantly

more acres than that, but are estimating exactly how many acres need care to meet their contract.

I would encourage growers to continue to explore mechanized pruning. Mechanized pruning offers the ability to reduce the labor requirement of pruning significantly. So much so, it is a practice that may not require a migrant labor force, if that labor force is unavailable. It also facilitates the ability of the grower to economically postpone crop adjustment into the growing season. I continue to be challenged by the financial diversity in the industry, right now. Until the market improves, I would be hesitant to recommend an investment in mechanized pruning for growers smaller than 100 acres. Typically, with a healthy Concord market, growers as small as 50 acres can make an investment in a pruning machine.

Hand pruning costs have risen from approximately $185 per acre to $230 per acre in the last 5 years. While we have seen pauses and declines in the cost of labor, there is significant evidence pruning cost will exceed $260 per acre in the next 5 years. Minimum wage laws, macroeconomic wage trends, and immigration policy are all possible ways we could see upward price pressure on pruning.

While we wait for a robotic pruner, a technology that will not likely arrive in time, the understanding of mechanized pruning has taken quite a few steps forward. Mechanical improvements have increased efficiency and performance. Viticulture research has a much greater understanding of managing a vine that looks different from what you're accustomed to. The larger fact remains, over the next five years, those that machine prune will be more likely to be profitable than those that do not.

Cultural Practices

Luke Haggerty,Viticulture Extension Associate, Lake Erie Regional Grape Program

Cover Crop Project: "Using Cover Crops to Improve Soil Health and Vine Productivity in Intensively Managed 'Concord' Vineyards"

The New York Farm Viability Institute awarded a grant to the Lake Erie Regional Grape Program (LERGP) titled "Using Cover Crops to Improve Soil Health and Vine Productivity in Intensively Managed 'Concord' Vineyards". With this funding, we have measured how planting different cover crop mixes affects soil health and vineyard productivity over the course of two years. Although cover crops are not new to area vineyards, our program wants to analyze what is happening above and below ground in order to provide research-based recommendations for cover crop seed mixes in Concord vineyards.

Dr. Terry Bates, LERGP, discusses soil and vine health in this soil pit demonstration of Concord grape root systems during cover crop field day.

In this project we are teaming up with area growers currently using cover crops in order to measure possible benefits in different seed mixes. The focus of this project is to collect physical, chemical, and biological measurements, soil compaction, vine size, and noxious weed data and identify cover crop mixes that have a benefit to Concord production.

On September 1st, the program hosted a workshop and field day at the CLEREL in Portland to educate over 70 participants on improving soil health and introduce ideas for planting cover crops in Concord vineyards. Early results from cover crop use, which is widespread in vegetable crops, are promising for improving soil health and increasing vine health and productivity in area Concord vineyards.

Evaluation of Replant Practices in Lake Erie Region Vineyards

The process of replanting missing vines is a task all grape growers will have to endure at some point. Extremely low temperatures in 2014 and 2015 inflicted winter injury on many grape cultivars throughout the Lake Erie region, New York State, and elsewhere in the northeast. With the need to replace dead and

damaged vines, we are evaluating different methods of replant practices based on vine performance and cost effectiveness. Results will identify survival rates, growth performance, and labor costs. From this information we will be able to identify replanting best practice for area grape growers. During the 2016 growing season, we measured second year vines (planted in 2015) that were planted using five different replant methods and collected data on vine performance. We will be collecting data on these vines until they are in full production.

Vineyard NDVI Sensing

The NDVI sensing efforts expanded again this year. However, as the research effort focuses on variable rate there has been less time for the program to sense grower vineyards. This year we implemented an NDVI loaner system that allowed growers to use our equipment free of charge. With the information (maps) we look for patterns within a block that indicate where vine vigor (size) is relatively small or large. If desired, the canopy sensor data can then be calibrated to an actual vine size by taking pruning weight measurements within the block. The SCRI grant awarded to Dr. Bates will allow advancements in this technology (above information). Other practical uses of NDVI include targeted crop estimation, soil and petiole sampling or identifying production-limiting factors in the low vigor areas; which will lead to solutions on how to remedy these issues.

We are planning to offer loaner NDVI sensing for area growers during the 2017 season. Growers who want to participate are encouraged to talk to the LERGP extension team.

Frost Prevention: KDL

Tim Martinson (Senior Extension Associate), Luke Haggerty (Extension Associate LERGP), Hans Walter-Peterson (Finger Lakes Grape Program Extension Associate)

Spring frost after bud burst can cause losses to grape growers as there are very few ways of protecting tender green tissues in the spring. KDL, a potassium salt-based material has shown promise as a material that can protect from freeze injury when applied within 24-48 hours before a frost event. Chemical company AgroK supplied KDL product and funding to assess the effectiveness of their product against frost. Twenty five vineyard blocks in New York and Pennsylvania were flagged for control, and treatment sections and area growers were ready to spray at a moment's notice. We will continue this project in 2017.

Soil Recommendations

The LERGP continues to offer soil recommendations to area growers. Over the 2016 growing season, we submitted 118 soil and petiole tests to Cornell University and made recommendations based off the tests. Once the tests are returned we sit down with growers and develop a nutrient management plan that fits the growers need. Growers are educated on how to accurately measure vineyard nutrient requirements and efficiently apply what is needed. This outreach effort provides specific nutrient recommendations that meet grape vines' needs and limit excess nutrients that could find their way into nearby watersheds.

Moving forward, the grape program plans to continue research and extension efforts that create awareness and accuracy of nutrient application. Soil types and vine size change throughout the vineyard, so applying a set rate over the whole vineyard is inefficient. Advances in sensor technologies are heading toward variable-rate nutrient applications that apply fertilizer based on vine size and/or the soil type. Other research efforts are looking at cover crops as a way of producing and recycling soil nutrients naturally, which could decrease the amount of fertilizers grape growers would need to apply.

Gearing up for on-the-fly, variable rate, mechanical crop regulation in Concord vineyards:

Dr. Cain Hickey and Luke Haggerty

Two geospatially referenced, mechanical crop regulation pilot trials were initiated in 2016 in two commercial vineyards that had inherent spatial variability in vine growth. This spatial variability was characterized via the use of ATV-mounted NDVI canopy sensors to estimate vine growth and productivity. This spatial variability information was then turned into a prescription map so that the mechanical 'shoot thinning' and 'crop thinning' rate changed as the tractor was driven into vineyard sections characterized by "small," "medium," and "large" vines. Vineyard output maps show promising results for these mechanical crop regulation tools to be used on-the-fly without any manual adjustment by the tractor operator. This work shows promising economic impact because it permits precise crop regulation throughout vineyard regions that differ in their productivity, thereby matching crop to vine size and reducing the incidence of over- and/or under-thinning. It is hypothesized that variable rate crop regulation will make vine size more uniform across vineyards, and will eventually increase perennial vineyard productivity and profitability. Plans are to take these crop regulation tools to more formal field trials in 2017. To see a video on our shoot thinning research go to https://youtube/Ee6K0nK4_hE.

Extending the Information. A Year into the Efficient Vineyard Project

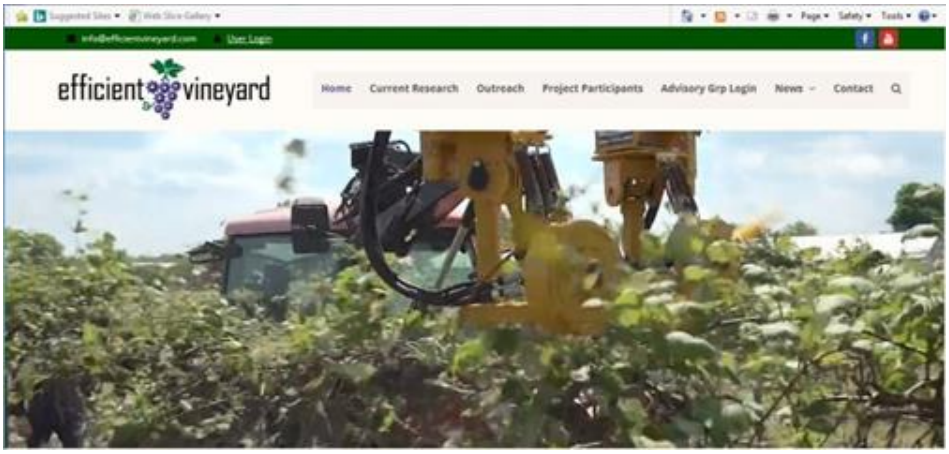
Tim Weigle, Terry Bates, Kevin Martin and Luke Haggerty

A lot has happened in the first year of the USDA/NIFA Specialty Crop Research Initiative Project. The project team met in March 2016 at the Cornell Lake Erie Research and Extension Laboratory in Chautauqua County, NY to not only plan for the upcoming growing season, but to also assist the Technology Adoption and Outreach team in developing a project brand. After much discussion, the project was given the moniker, "Efficient Vineyard".

While there has been a lot of great research conducted during the first year of the Efficient Vineyard project by the project participants, (https://www.efficientvineyard.com/project-participants/) it would mean little if the results were not made available to those who would be implementing the variable rate practices in their vineyard operations. This is where the Technology Adoption and Outreach group comes in.
Since the project is being carried out over a very large geographical area (from New York and Pennsylvania to California), a logo was developed to pull all areas of the project together in an easily identifiable project "brand" and a website

(https://www.efficientvineyard.com/) was developed to ensure current project information was available to project team members, project cooperators, project funders and those across the United States who are interested in the implementable aspects of the project.

A survey was conducted at the beginning of the project to assist in determining the baseline knowledge of the project, current use of spatial data and variable rate management in vineyards and how end users would prefer to receive project information. The survey was presented at grower meetings in California, New York and Pennsylvania and as a web-based instrument for members of the grape industry across the US. Members of the Efficient Vineyard Advisory committee were invited to participate in the survey as well. Results of the survey along with an executive summary can be found under Outreach on the Efficient Vineyard website.



Efficient Vineyard project director, Dr. Terry Bates, Cornell University, put together a presentation providing an overview of the progress that has been made in the first year in all aspects of the project including Project Oversight, Precision Sensing, Spatial Data Technology, Differential Vineyard Management, Economic Evaluation and Assessment and Technology Adoption and Outreach. This presentation can be found under Current Research on the Efficient Vineyard website.

Funding Source: USDA NIFA Specialty Crop Research Initiative

Educational Programming

LERGP Extension Team - Tim Weigle, Andy Muza, Kevin Martin and Luke Haggerty

A total of 751 grape growers and members of the Lake Erie grape industry participated in 26 LERGP educational events during the 2016 growing season. These events included weekly Coffee Pot meetings (18), CORE Pesticide Trainings (3), Winter Grape Grower Conference, and a Cover Crops Meeting, as well as the annual meeting held in conjunction with the Erie County PA Hort Society at Gravel Pit Park in North East, PA.

Members of the LERGP Extension Team provided well over 2,000 phone, email and on-site consultations on IPM, business management and viticulture practices to growers. In addition, the team conducted implementation and applied research projects in the commercial vineyards of 47 cooperating growers.

Funding Source: Chautauqua, Cattaraugus, Erie and Niagara County Cooperative Extension Associations in New York, Erie County Extension Association in Pennsylvania, National Grape Cooperative, Constellation Wine, Walker's Fruit Basket, Cornell and Penn State Universities and NY Ag & Markets.

Pesticide Recertification Credits
Tim Weigle and Andy Muza

While education programming is important, the LERGP extension team also realizes the importance of providing the opportunity to receive pesticide recertification credits while attending our meetings. While some programming is not conducive to having credits available, the LERGP team made sure members of the Lake Erie Grape Industry had the ability to receive 58 recertification credits for PA and 31.5 recertification credits for NY at 23 meetings in 2016. Included in those credits were the ever elusive Core credits those with a PA license are always looking for. In 2016 the LERGP team provided the opportunity to pick up 14 core credits at 3 meetings.

Funding Source: Chautauqua, Cattaraugus, Erie and Niagara County Cooperative Extension Associations in New York, Erie County Extension Association in Pennsylvania, National Grape Cooperative, Constellation Wine, Walker's Fruit Basket, Cornell and Penn State Universities and NY Ag & Markets.

Network for Environment and Weather Applications (NEWA)

Our ever changing weather during the growing season, changes in pesticide regulations and labels, the development of pesticide resistance and even the changes in the way grapes are grown these days make informed IPM decision making a must for every vineyard operation. The Network for Environment and Weather Applications http://newa.cornell.edu (http://newa.cornell.edu/) provides weather and pest information that is critical in making pest management decisions using pest model information that is constantly updated for grape berry moth, black rot, Phomopsis, powdery mildew and downy mildew. A daily visit to the website provides the latest in weather events, infection periods for the major grape diseases, and degree day information needed to properly time insecticide applications for grape berry moth.

For the third year in a row growers had the opportunity to receive an email – eNEWA-grapes that provided an overview and results of weather conditions and pest model results from the station(s) of their choosing. Participants could choose to receive eNEWA-grapes on the hour, at any time during the day, including multiple times during the day, to fit the needs of their operation. An end of season survey was sent to the 42 participants in the 2016 eNEWA-grapes project with 18 responding.

With the wealth of information found on the NEWA website, eNEWA-grapes was developed to serve as a gateway to the website. The survey showed that 78% of

participants (45% frequently and 33% occasionally) visited the NEWA website to gain more information after receiving the eNEWA-grapes email. An overwhelming 100% of respondents used information in the email to help in their spray decisions (94% replied yes to the question and 6% responded that they sometimes used the information). When asked if they saw an increase in profitability from reduced sprays or increased crop/crop quality due to the use of information found in eNEWA, 89% of respondents indicated they had seen an increase in profitability (45% saw an increase of $1 -25 per acre, 22% say an increase of $26 - $50 per acre and 22% found saving of more than $50 per acre.

Funding source: LERGREP Inc (National Grape Cooperative, Constellation Wine, Walkers Fruit Basket) and NY Wine & Grape Foundation.

State Cooperative Agricultural Pest Survey (CAPS)

Tim Weigle (NYS IPM Program and LERGP), Kim Knappenberger (LERGP), Alice Wise (*CCE Suffolk County,) Hans Walter Peterson (Finger Lakes), James O'Connell (Hudson Valley Lab) and Marc Fuchs (NYSAES, Geneva)*

For the sixth straight year grapes were selected for inclusion in the State Cooperative Agricultural Pest Survey. The purpose of this survey is to protect New York State's ability to freely export agricultural commodities. By trapping for potential invasive species that have been found in other areas of the United States, or that have the potential to make their way into New York from foreign soils, we compile the negative data necessary to ensure that we are not shipping a targeted invasive species with a commodity from a specific region. The 2016 grape commodity survey was conducted in conjunction with Cornell Cooperative Extension's NYS IPM Program and Grape Programs in the main growing regions of New York State; Lake Erie, Finger Lakes, Long Island and the Hudson Valley. Traps were placed in vineyards and nursery blocks starting in early July in all regions and were serviced biweekly for a total of 6 visits. The three target moths involved in the survey are: European Grapevine Moth, European Grape Berry Moth, and Light Brown Apple Moth. 366 traps were deployed in 38 vineyards total; 7 in the Hudson Valley, 9 on Long Island, 15 in the Finger Lakes Region and 7 in the Lake Erie Region. In addition, traps were deployed in 4 nursery blocks. Traps were also deployed in Long Island and Finger Lakes vineyards for vine mealybug, a potential vector for grape viruses. Once again, a visual inspection for Australian Grapevine Yellows and Flavescence doree was conducted in the same vineyards and nurseries used to conduct the Grape Commodity Survey (GCS). A visual inspection was also conducted in participating areas for the Spotted Lanternfly, a new invasive species currently found in one county in Pennsylvania. Leaves were collected from participating vineyards and nursery blocks in the spring and fall for submission to Marc Fuch's lab for testing to determine the presence/absence of a myriad of viruses.

Funding Source: NYS Ag & Markets, USDA APHIS Cooperative Agricultural Pest Survey and US Farm Bill

Jamestown Community College Summer Intern Project

Tim Weigle, Luke Haggerty and Kevin Martin

Nick Certo was the first intern in a new cooperative internship program between the Lake Erie Regional Grape Program, the NYS IPM Program and Jamestown Community College started in 2016. Nick worked with members of the LERGP extension team to get exposure to the basics of grape growing as well as to get firsthand experience in how a field research project is conducted. Nick assisted in the collection and "crunching" of data related to the alternative management strategies for grape rootworm project being conducted in 5 Lake Erie region vineyards. Nick finished off his internship with a presentation on his work with the grape rootworm project at the LERGP Processor Field Representatives meeting in August. Nick also presented a hard copy publication documenting his time as an intern to the extension team. Please feel free to stop by CLEREL and take a look at some of the great work that was accomplished by Nick during his internship.

The extension and applied research projects that the LERGP team and NYS Grape IPM Program work on come from a priority list developed by our advisory committees, individual growers, juice processors, wineries, and other members of the grape industry across New York State and Pennsylvania. If you have any suggestions to help us focus our research and extension programming, we would like to hear from you.

A very special thank you to our LERGP Advisory Council members:

This group helps the LERGP team by providing input and suggestions to enhance our programming in areas such as conference content, meeting topics and locations, areas of interest and relevance in terms of research, and overall guidance to further develop the program.

Mark Amidon
Dawn Betts
Kris Kane
Mario Mazza
David Mobilia
Chris Ortolano
Abram Rak
Dan Sprague
Rich Stabins
Tom Towers
Mathew Walker

Research

Terry Bates, Director, CLEREL

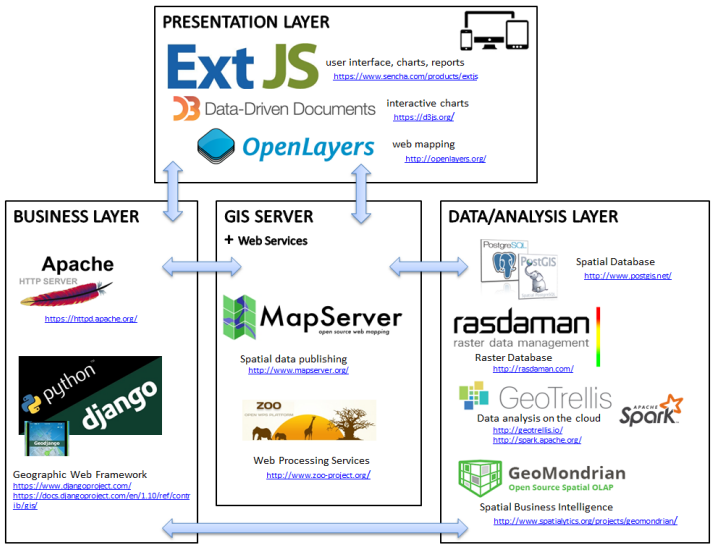
Efficient Vineyard SCRI project: Precision Vineyard Management: Collecting and Interpreting Spatial Data for Variable Vineyard Management

This project aims to introduce, modify, and implement the tools and techniques of precision agriculture typically used in annual crops, such as corn and wheat, to perennial fruit cropping systems, such as grapes and apples, to improve production and profit and decrease environmental impact in these sectors of agriculture. In both annual and perennial systems, plant growth and crop production can be influenced by variable environmental conditions such as soil type, mineral nutrition, or water availability; therefore, the precision agriculture tools from one system can be partially transferred to the other. Grapes and other perennial fruit crops, however, are grown as permanent vines or trees where the growth and fruit yield in one year will influence the growth and return yield in the second year. The carryover nature of perennial crops adds great complexity to the prospect of precision management because farmers are not only interested in the soil environment but also with spatially measuring and managing canopy growth, fruit yield, and fruit quality. Our research has shown that commercial vineyards vary greatly in soil, canopy, and crop characteristics and could benefit, both environmentally and economically, from variable rate management; however, the grape industry lacks the appropriate sensors, horticulture information, big spatial data processing, and variable rate management tools to achieve greater production efficiency and profitability. The purpose of this project is to develop the hardware and software tools needed for “precision viticulture.”

This work is intended to directly help U.S. grape producers in all sectors of the industry (juice, table, raisin, and wine) regardless of vineyard size or location. We have initiated on-farm field research with cooperating growers in regions central to the various grape industries. For example, the heart of the U.S. table grape industry is located in California’s south central valley where we have initiated trials near Delano, CA. The largest Concord grape producing area for juice is located in the Lake Erie region of Western NY and PA and we have trials near Westfield, NY. It is also the intent of this project to indirectly support other perennial fruit cropping systems such as apples and citrus which face similar precision agriculture challenges as grapes.

To address the goals and objectives, this project was broken into five different but integrated themes: management and testing; Economic evaluation and assessment; and Technology adoption and outreach.

The 2016 objective of the Precision vineyard sensing theme was to generate maps of vineyard soil, canopy and crop data and to develop and validate different sensors/ methods to measure the characteristics. In commercial juice, table, and wine grape vineyards, mobile soil, canopy, and crop sensors were attached to farm vehicles and used to collect and map spatial data. Sensor information was validated by collecting manual soil, canopy, and crop measurements at designated points in the vineyard block. Soil and canopy sensing was achieved with commercially available instruments, data loggers, and GPS receivers. For non-destructive crop imaging, three ruggedized image acquisition and analysis systems were developed at Carnegie Mellon University. The imaging system was pointed at the grapevine fruiting zone and driven through the vineyard. Images were collected and processed with developed software algorithms to generate berry count, berry size, and berry color. Over 400,000 images were collected and processed with each field scan and the resulting spatial information was used to create yield and color development vineyard maps. In addition, two harvester mounted grape yield monitors were evaluated to generate accurate yield maps at harvest.



The 2016 objectives for the Spatial Data processing theme were to establish a clearinghouse for project spatial data to ensure that the data were correctly processed. A mechanism is needed to handle the large amount of data and layers being generated by the project. In addition, grape producers need an easy way to collect, process, and interact with spatial data. In 2016, a web based clearinghouse for project spatial data was generated for access by cooperators. A prototype spatial decision support system (SDSS) was also developed as an open source platform for future industry use. The future vision for the SDSS is for stakeholders to upload spatial data to this web based system that cleans and processes the spatial data layers into interactive vineyard management maps.

For the Differential vineyard management theme, the 2016 objective was to scan and identify commercial vineyards and determine variable rate management options based on the tools generated from the first two themes. Eight commercial wine grape, 6 juice grape, and 3 table grape vineyards were soil, canopy, and crop scanned and processed. We are currently working with the cooperating growers on a variable rate management plan for 2017. In addition, we integrated spatial prescription maps generated from the project, precision Ag hardware and software available from field crop systems, and current vineyard mechanization equipment, to achieve and demonstrate on-the-fly variable rate shoot thinning and fruit thinning in commercial vineyards.

Although it is early in the project to construct a full economic analysis of spatial data driven variable rate management, this theme assembled and updated existing budgets for representative grape growers of wine, table, and juice grapes. This information was used to develop a general framework for evaluating economic benefits of variable management on (1) the ability to control harvest timing and (2) increase fruit quality. In addition, spatial

yield and fruit quality maps were used to generate spatial profit/loss maps for growers to visualize vineyard regions that were losing money and would benefit from differential management.
The 2016 objective for the Technology adoption and outreach theme was to determine preferred method(s) of learning of stakeholders and develop a portal of learning and a public "face" of the project. A project initiation survey was administered to stakeholders aimed at understanding their current interaction with precision ag technology. The "Efficient Vineyard" web site (www.efficientvineyard.com) was developed to extend project information to stakeholders. There is a public portion of the web site with research reports, blog posts, and project videos. There is also a restricted section for the project team and advisory group with more detailed work plan and progress report documents.

Integrating the five themes, the overarching accomplishment in year one of this project was the development of the fundamental tools needed in each area for the future project success. Mobile sensors were developed and tested for spatial vineyard soil, canopy, and crop data collection. These data were passed to a prototype spatial data processing system which cleans, analyzes, and projects individual data layers into an integrated vineyard management map. The spatial prescription maps were integrated with precision ag field hardware and software to control the rate vineyard mechanization equipment in real time. We have used the full complement of sensing equipment and spatial data processing in cooperating wine, table, and juice grape vineyards to identify potential vineyards for variable rate management trials in 2017. Along with viticulture performance, the effect of variable rate management on production efficiency and economics will be evaluated and the baseline information for this analysis has been collected. Finally, a project web site for stakeholder outreach was successfully developed and has been populated with current project results.

In the Vineyards, PA

Andy Muza, County Extension Educator, Penn State, LERGP

2016 GBM Degree Day Model Trials in Concord Vineyards in Erie County, PA

In 2016, due to grower interest, GBM Degree Day Model trials were continued in 3 Concord vineyards in Erie County, PA. In close collaboration with growers, 3 high to severe risk blocks were managed using the GBM Model in NEWA (http://newa.cornell.edu/index.php?page=berry-moth) to time spray applications. Insecticide applications for the second and third generations were initiated according to the timings (810 and 1620 degree days) indicated by the model. In addition, this season, the GBM Model indicated that by September 8th the majority of sites from Erie County, PA – Niagara County, NY reached or surpassed 2430 degree days (when egg laying is estimated to occur for a fourth generation).

Growers in the GBM Degree Day Model trials were advised to apply Intrepid or Altacor for the initial spray for the second and third generations. An additional insecticide application of their choice 7 – 10 days later (back to back applications for second and third generations) was also suggested. The choice whether to apply an insecticide treatment at the 2430 degree day timing was determined by each grower.

Throughout the season, a total of 25 clusters from Border Rows (rows 1 and 2) were examined (non-destructive sampling) at each site to monitor GBM egg laying activity and injury levels to clusters (Figure 1). To determine final GBM injury levels, preharvest destructive sampling was conducted at the 3 sites where the model was used. In addition, 5 high to severe risk sites not directly involved in this study were also sampled to obtain comparative data. A total of 10 clusters from Border Rows were collected at each site. The total number of berries, % Incidence (clusters with GBM injury), % Severity (berries with GBM injury), and % Missing Berries were recorded. Spray records and injury levels will be evaluated to determine the efficacy of the GBM Degree Day Model.

Figure 1. Concord cluster with GBM eggs and injury

Vineyard Scouting Network – 2016

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

The objective in continuation of the Vineyard Scouting Network for 2016 was to provide information throughout the season on developing pest problems in vineyards. Monitoring of designated vineyard blocks for insect and disease problems began on June 9 and continued on a weekly basis until September

29. Four sites in the Girard/Lake City area and 4 sites in the North East area were routinely checked. In addition, over a dozen other sites were checked periodically during the season. Scouting information along with accompanying photos of pest problems, obtained during the weekly monitoring, were reported in the Crop Update. The inclusion of pictures was to assist growers in accurate identification of insects, diseases and pest injury on leaves and clusters.

Diseases

Disease pressure from phomopsis, black rot, and downy mildew was unusually low this season due to prolonged hot, dry conditions. In fact it wasn't until September 8 when downy mildew leaf infections were finally found on suckers in a Delaware block (Figure 2) and on a few leaves in a Concord block.

Figure 2. Downy Mildew lesions on Delaware leaves

In a majority of the vineyards scouted, powdery mildew leaf infections ranged from low - moderate levels for most of the season. However in 2016, powdery mildew was more prevalent on the berries (Figure 3) at a number of sites throughout the region.

Figure 3. Concord cluster with Powdery Mildew Infection

As a reminder for next season: Concord berries are highly susceptible to infection from the immediate prebloom stage to about 2 weeks after fruit set. During this period, use fungicides which are **highly effective** (e.g., Quintec, Vivando) against powdery mildew and spray **every row**. It is also critical to apply the first POSTBLOOM fungicide spray within 10 – 14 days of the IMMEDIATE PREBLOOM spray. Do not stretch the spray interval beyond 14 days.

Insects

Grape Berry Moth – At Severe Risk sites, as expected, the number of clusters with GBM injury was high but the number of berries injured/cluster differed depending on efficacy of the insecticide spray program.

At High Risk sites cluster and berry injury levels were more variable among sites examined. Some areas had higher injury levels than expected while others had lower injury levels than in previous seasons.

Figure 4. Japanese beetles feeding on Concord leaf

Japanese Beetle – the first beetle of the season was recorded at a Concord site on June 23. Population levels started to increase in some blocks to the point where leaf injury (Figure 4) was noticeable by the first week in July. However, Japanese beetle was not a widespread problem in mature Concord vineyards this season.

Grape Leafhopper – Grape leafhopper populations began building at some sites by the end of July but generally levels remained low – moderate throughout the season. At the end of the season only a few sites monitored had high populations of adults causing heavy leaf stippling. There were also scattered reports from growers concerning heavy leafhopper infestations. But, considering the hot, dry season I expected to find higher population levels in vineyards than in previous seasons.

North East, PA Update

2016 Plant Pathology Research and Extension Activities

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

• Yield regulation and bunch rot control in winegrapes: effect on vine and fruit health, yield components, and fruit composition. A cooperative project with Dr. Michela Centinari. The long term goal of this project is to provide wine and grape industry stakeholders with research-based information on the benefits and cost-effectiveness of yield regulation practices for high-yielding inter-specific hybrids and *V.vinifera* varieties. Our second year of data reveals that early leaf removal, as a method of yield regulation, can reduce crop in some varieties and may be a more cost effective alternative to manual crop thinning, if the method can be mechanized. A study was initiated to examine Pre-bloom mechanization of leaf removal by air-pulse leaf removal technology (Collard, Blue-line); a tractor mounted unit that shoots bursts of air into vines to shatter leaves in the cluster zone. Thus far, research into this treatment shows little to no negative impact on inflorescences, but it has reduced cluster weights and yields in some varieties through reductions in berry number per cluster.

Pre-bloom timing of leaf removal has also been shown to be a long term, non-chemical strategy for bunch rot control in susceptible varieties, that can reduce reliance on synthetic pesticides and can be more effective at reducing bunch rots than the currently recommended post-fruit-set timing. However, most growers who apply fruit-zone leaf removal to their premium wine grapes, do so by hand, which is very expensive in today's tough labor market. Mechanization of this method over the past two years has been somewhat positive in terms of reduction of fruit susceptibility to bunch rots, producing intended effects similar to hand leaf removal in some varieties and trellis systems. But more evaluation of this method is required to improve its efficacy and this research is ongoing.

• New Table Grape Vineyard: Its purpose will be to generate viticultural production and disease and insect pest management data on previously untested table grape varieties for the Northeastern U.S. The data will be used to explore and offer to growers, potential new market opportunities. Severe cold in February 2015 damaged the vineyard, but the vineyard is in the process of recovery this year and we hope to begin cropping them lightly in 2017.

• The Effects of Rainfall on Fungicide Residue Concentrations, Redistribution, and Efficacy. Our goal was to define the effect of rainfall on mancozeb (one of the most commonly used active ingredients in PA vineyards) persistence and efficacy. The first inch of rain (or perhaps just the first rainfall event) appears to remove about 65% of the initial deposit, two inches of rain removes about 80% of the deposit, and three inches removes about 90% of the deposit. This suggests that the majority of the initial deposit is highly soluble and is capable of being redistributed (possibly to new growth not previously sprayed) during rainfall periods.

The results also revealed that even though the majority of pesticide is removed after even small amounts of rainfall, very little residue is actually required to control diseases like

black rot and downy mildew, and that disease control failures may often be a result of incomplete coverage, either through sprayer limitations, poor sprayer calibration, or growth of new, unprotected tissue subsequent to application, rather than residue reduction by rainfall.

• Efficacy of alternative fungicides for grape disease management. We evaluated three relatively new active ingredients with very low mammalian toxicity, for control of diseases on juice and wine grapes. OSO 5%, Double Nickel, and Fracture all provided various levels, and often significant control, of powdery mildew on leaves and clusters of Concord, Niagara, and Chambourcin grapes. However, none were as effective as a rotational program of current standard materials for powdery mildew control (Quintec, Vivando, Torino). None of these new fungicides controlled black rot. Testing of these materials will continue in 2017 to determine how best to position them in grape disease management programs.

Penn State Lake Erie Regional Grape Research and Extension Center

Jody Timer, Entomology

In the North East area, Grape Berry moth (GBM) was in abundant supply this season. Trapping data collected over the past 13 years indicates that this season was above average. We are in the second year of spray timing trials based on percentage of GBM emergence and its correlation to spring temperatures. Our hypothesis states that the more intimately the GBM spring emergence coincides with grape bloom the greater the survivorship of the first generation of GBM. Consequently, a large first generation emergence would result in subsequent generations, all of which would emerge in the presences of suitable hosts, exponentially proliferating. It is hoped that this experiment will lead to a more precise spray timing recommendation which can be incorporated into the NEWA model. These sprays were aimed at 10, 25, and 50 percent emergence sprayed once and twice a generation. Spring emergence both years coincided with wild grape bloom. Both years 25% spray applied twice per generation appeared to have the greatest GBM control.

Spotted wing drosophila (SWD) trapping data over the past six years prove that SWD continues to emerge earlier each year. Research on a variety of grape cultivars showed that SWD was present at the end of the season in all varieties tested. This research also concluded that SWD prefer ripe fruit and rarely attack grapes before verasion. Testing will continue to discern what impacts these infestations have on the quality of grapes at harvest.

The Brown Marmorated stink bug trapping over the last five years suggests that their presence in the area is increasing annually. Grapes are one of their preferred hosts and prior research showed that they can survive solely on diet of grapes. However, their numbers are not yet plentiful in this area, and they are not yet presenting a risk to the grape industry. Research on their defensive odor when raised on various diets continues. This research hopefully can be utilized to detect stink bugs in import and export materials.

We are completing the first year of research to determine if an optimal insecticide and fungicide spray program applied to extremely high-pressure vineyards is able to of reduce insect and disease injury to acceptable threshold levels. We are also examining the economic feasibility of such a spray program. The first year of this program showed approximately s 50% reduction in insect and disease damage.

LERGP Website Links of Interest:

Check out our Facebook page!!

Cornell Lake Erie Research & Extension Laboratory Facebook page
https://www.facebook.com/Cornell-Lake-Erie-Research-and-Extension-Laboratory-678754995584587/?fref=ts

Efficient Vineyard:SCRI Web-site
https://www.efficientvineyard.com/

Table for: Insecticides for use in NY and PA:
http://lergp.cce.cornell.edu/submission.php?id=69&crumb=ipm|ipm

Crop Estimation and Thinning Table:
http://nygpadmin.cce.cornell.edu/pdf/submission/pdf65_pdf.pdf

Appellation Cornell Newsletter Index:
http://grapesandwine.cals.cornell.edu/cals/grapesandwine/appellation-cornell/

Veraison to Harvest newsletters:
http://grapesandwine.cals.cornell.edu/cals/grapesandwine/veraison-to-harvest/index.cfm

Go to http://lergp.cce.cornell.edu/ for a detailed calendar of events, registration, membership, and to view past and current Crop Updates and Newsletters.

LERGP at CLEREL
6592 West Main Road
Portland, NY 14769
716-792-2800

Lake Erie Regional Grape Program Team Members:
Andy Muza, (ajm4@psu.edu)Extension Educator, Erie County, PA Extension, 814.825.0900
Tim Weigle,(thw4@cornell.edu) Grape IPM Extension Associate, NYSIPM, 716.792.2800 ext. 203
Kevin Martin, (kmm52@psu.edu) Business Management Educator, 716. 792.2800 ext. 205
Luke Haggerty, (llh85@cornell.edu) Grape Cultural Practices, 716.792.2800 ext. 204

Cornell University
Cooperative Extension

PENNSTATE
College of
Agricultural
Sciences