LAKE ERIE REGIONAL GRAPE PROGRAM

Vineyard Notes

December 2014

Mark Your Calendars for these Upcoming Events:

Monday, March 16, 2015- 8:00am-4:00pm
Winter Grape Grower Conference at SUNY Fredonia Williams Center

Thursday, April 9, 2015- 8:00am-4:00pm
Wine Work Shop at CLEREL

Cornell University
Cooperative Extension

Lake Erie Regional Grape Program

Right Sizing Capital Investments

Kevin Martin, Penn State Business Management Educator, LERGP

Commercial grape growing require larger capital investments than nearly all commodity based crops, based on most benchmarks. Constant pricing pressure and technological advancements continue to pressure growers toward higher levels of capital investments. We work with growers to time investment, determine an acceptable return on investment and increasing overall production efficiency.

This summer growers have been considering investments in bulk harvesting equipment as the National Grape plant in Westfield will be capable of receiving bulk shipments in 2015. Growers are also considering new harvesters, harvester updates, multi-row equipment, sensor technology, and innovative fertilizer spreaders. Most importantly, growers have been making investments in marketing contracts and additional acreage as a Concord surplus has spurred movement of marketing contracts and acreage from smaller growers to larger growers.

By providing rough benchmarks of an expected ROI based on a series of assumptions the project begins a dialogue between Extension and growers to encourage the consideration of individual farm variables. In doing so, growers have a more accurate perception of the equipment, technology and an expected ROI before large investments are made.

In this area I have individually worked with 22 growers over the last quarter. Some of those growers have relied heavily on the information and required a detailed involvement in the decision-making. The dialogue includes all forms of communication including telephone, office visits, e-mail and an occasional site visit. I will continue to work with growers to provide information and recommendations.

Economic Sustainability of the Bulk Juice Industry

2013 Results in 2014

Yield monitoring and production reports from Processors revealed a significant increase in yields as a result of crop estimation and thinning in 2013. Nearly half of all growers thinned as a result of processors and Extension working together to provide information and updates to growers. A number of significantly over-cropped growers saw yields fall by 25% - 35%. The increased value of the return crop is conservatively estimated at $4,500,000. This valuation was not completed in a vacuum. It takes into account the juice grape market conditions and the negative impact high yields have had on price. It is also important to avoid overstating the impact of the large crop size. The ability of growers to manipulate crop load and avoid cyclical yields, in the long run, will reduce downward pressure on juice market share. Avoiding cyclical yields also substantially reduces the price per ton required to profit.

Networking and Market Updates

Consecutively large crops as well as a poor market for juice led to market cancellations of 25,000 tons. With growers scrambling, we did our best to provide timely information for planning and strategic purposes. The program held networking meetings and fielded over 40 individual inquiries. Given the nature of the situation, growers did remarkably well. An estimated 60% of cancellations were delivered to other processors. While the salvage market grew, less than half of those deliveries were made to the low-priced salvage market. The estimated market value of can-

celled grapes that were delivered is between $2,900,000 and $3,200,000.

The juice market and the Concord market will continue to struggle. The large crops push the price of Concord down to parity with juices that are traditionally less expensive. Low commodity prices for those indirect competitors has pushed the prices of those products down even further. While Extension has no magic bullet, we'll continue to work with growers to maximize their chance of long-term sustainability throughout this bear market.

Educational Programming
Tim Weigle, Andy Muza, Kevin Martin, Luke Haggerty, Terry Bates and Kim Knappenberger

A total of 924 grape growers and members of the Lake Erie grape industry participated in 27 LERGP educational events during the 2014 growing season. These events included weekly Coffee Pot meetings, LERGP Growers' Conference, CORE Pesticide Training and Twilight meetings at Thompson Ag in Hanover, as well as, the LERGP Twilight and Erie County Hort Society BBQ in Gravel Pit Park in North East, PA. To assist in the implementation of research based information, members of the LERGP Extension Team provided phone, office and/or on-site consultations on viticulture, IPM, and business management practices to over 600 growers. In addition, the team conducted implementation and applied research projects in the commercial vineyards of 30 cooperating growers.

State Cooperative Agricultural Pest Survey (CAPS)
Tim Weigle (NYS IPM Program and LERGP), Kim Knappenberger (LERGP), Libby Tarleton and Alice Wise (CCE Suffolk County,) Mike Collizi and Hans Walter Peterson (Finger Lakes), Joseph Whalen and Peter Jentsch (Hudson Valley Lab) and Marc Fuchs (NYSAES, Geneva)

For the fourth 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 2014 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 place in vineyards starting in early to mid July in all regions and were serviced biweekly 6 times. The four target moths involved in the survey are: European Grapevine Moth, Summer Fruit Tortrix Moth, European Grape Berry Moth, and Egyptian Cotton Leafworm. 296 traps were deployed in 27 vineyards total; 5 in the Hudson Valley, 5 in Long Island, 12 in the Finger Lakes Region and 5 in the Lake Erie Region. In addition, traps were deployed in 2 nursery blocks. No target moths were found in any of the traps.

New for 2014, a 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). Visual examinations were conducted in 5 vineyards in the Hudson Valley (1 in Dutchess and 4 in Ulster County) 5 in Long Island (5 in Suffolk County), 12 in the Finger Lakes Region (2 in Schuyler, 3 in Seneca, 1 in Steuben, 2 in Ontario and 4 in Yates Counties) and 5 vineyards in the Lake Erie Region (5 in Chautauqua County) and 2 nursery blocks. There were no reports of Australian Grapevine Yellows or Flavescence doree in any of the 27 vineyards or 2 nurseries involved in the survey.

Virus sampling was also conducted in 2014 in July and again in September of 2014 using the vineyards and nurseries used to conduct the GCS, as well as, additional vineyards/vineyard blocks where deemed appropriate. The full report is available on the Lake Erie Regional Grape Program website at; http://lergp.cce.cornell.edu/submission.php?id=82&crumb=ipm|ipm

Japanese Beetle Management using Persistent Entomopathogenic Nematodes
Greg Loeb, Elson Shields and Tony Testa, (Department of Entomology, Cornell University) and Tim Weigle.

2014 was the third and final year for this research project looking at the use of native entomopathogenic (insect attacking) nematodes to manage Japanese beetle populations in the sod row middles of grapes in the Lake Erie and Finger Lakes regions of New York State. A mixture of entomopathogenic nematodes, which are native to New York, have been used by Dr. Shields' program to effectively manage Alfalfa Snout Weevil in alfalfa fields since 2007. It is thought that Japanese Beetle, another member of the white grub complex, may also fall prey to these nematodes. Two vineyards in the Lake Erie region were involved with this project. This project has been hampered due to a limited Japanese beetle population since the start of the project. Examination of soil cores found little evidence of Japanese beetle larvae in either treated or control sections of the vineyard. There was however, a correlation between the establishment of nematodes and reduced foliar feeding from Japanese Beetle when compared to the control blocks.

Alternative Management Materials for Grape Rootworm
Tim Weigle, Greg Loeb, Elson Shields and Tony Testa

Grape rootworm, *Fidia viticida (Walsh)* , was once considered to be the primary insect pest of grapes in the eastern United States. Feeding on the roots of the vine by the larvae can lead to significant reductions in vine vigor and even death of the vine in as little as three years in heavy infestations. The introduction of the pesticide DDT has been credited with bringing this pest under control in the vineyards of the Lake Erie Region of New York. Grape rootworm is making a comeback in Lake Erie vineyards, reducing vine size and yield. Having dropped from the designation of a primary pest, NYS grape growers find they do not have the tools they need to effectively manage the reemergence of this pest. Currently, only one insecticide is labeled for use against grape rootworm in NYS raising concerns that the pest will develop resistance to that material in a short amount of time. In conjunction with Greg Loeb, Professor, Department of Entomology, NYSAES, two replicated spray trials using 4 insecticides currently registered for use on grapes in New York State were conducted in grower vineyards with grape rootworm populations in the Lake Erie grape growing region. The materials in these trials were chosen in part due to their mode of action being different from the material currently labeled for grape rootworm. Shaking count vines and collecting grape rootworm adults on a catching frame was used to determine the effectiveness of treatments. This sampling occurred just prior to the treatments being applied, immediately following the application, and two weeks later.

All four materials used in the spray trials (Admire Pro, Danitol, Leverage 360 and Sniper) were found to be effective against grape rootworm. Armed with this information, a 2ee will be applied for each of these materials, allowing grape growers to use them against grape rootworm in NY vineyards. This will provide the materials needed to effectively manage this pest for years to come, by implementing a resistance management strategy of rotating effective materials with different modes of action.

In a separate experiment, a potted vine study using entomopathogenic nematodes provided by Elson Shields Lab was undertaken at CLEREL. Five replications of four treatments (three combinations of three different nematode species and a control) were applied to the pots in early June to allow them to become established before the grape rootworm were added in early July. Each pot was "seeded" with 25 adult grape rootworm captured during evaluations of the above mentioned spray trials. The pots were destructively sampled for the presence of grape rootworm larvae in November. There were no significant differences seen between the treatments and control in this year's trial. Discussions are underway on how to improve the study in 2015 to ensure that each treatment starts with the same grape rootworm larval population.

BetaTesting of eNEWA-grapes
Tim Weigle, Juliet Carroll (NYS IPM Program) and Keith Eggleston (Northeast Regional Climate Center)

eNEWA-grapes is a daily email alert containing weather and grape pest model information from the Network for Environment and Weather Applications website http://newa.cornell.edu. A beta test was conducted to determine

if daily email alerts would encourage growers to make use of NEWA's weather and pest model information in their vineyard IPM strategies. The daily emails started on April 19, ended on September 10, 2014 and were sent to 47 participants across New York State and Erie County Pennsylvania.

An end of season survey was conducted and 24 of 47 surveys were completed. Survey results indicated that 62.5% of respondents rated the usefulness of eNEWA-grapes as great (best ranking), 25% rated it as above average, and 12.5% rated it as average. Fifty percent found that the eNEWA-grapes alert was great in helping them with their IPM practices, 41.67% found it above average and 8.33% found it to be of average help. In response to the question, "Were the grape berry moth and disease model information useful in your spray decisions?" 52.17% found the information to be great, 34.78% found it to be above average, 8.7% found it to be average while 4.35% found it to be below average. The below average rating can be tied to the respondent feeling that the grape berry moth model information needs to be easier to understand.

When asked it they looked forward to receiving the eNEWA-grape email? 91.67% of respondents said yes while 8.33% said no. One of the comments was that they found that going to the NEWA site themselves was more useful. One of the goals of the eNEWA-grapes was to encourage growers to access the NEWA web site to get more detailed information when the email alerted them to a potential problem.

A majority of respondents (63.64%) indicated they would not pay a $5/month subscription fee for the eNEWA-grape email. While one comment was "Small price to pay for valuable information" other comments indicated "it should be included in grape program membership fees", "$3/month was more reasonable", and "$5 a month was acceptable if there was the ability to pay only for specific months when it was needed".

Examining Diversification Potential – Hops Production in the Lake Erie Region
Tim Weigle and Greg Loeb

A second research/demonstration hop yard was planted in 2014 at the Cornell Lake Erie Research and Extension Laboratory (CLEREL) in Portland, NY to provide the resources needed to conduct applied IPM research projects for both weed/cover crop and insect/mite management.

Greg Loeb submitted and received funding for a CALS/CCE internship for a Cornell undergraduate to develop and work on a project involving biological control of two-spotted spider mites in hops. Results of this work were inconclusive as releases of predator mites did not create established populations in the hop yard and twospotted spider mites populations did not increase to damaging levels until after harvest should have been completed. Anna Long, the 2014 intern, was also able to participate in the grape rootworm project, the Japanese Beetle project and many of the extension meetings and activities to provide her insight into grape production in the Lake Erie region to round out her internship.

In conjunction with Cattaraugus County CCE, Catt County Economic Development Agency, and Dan Minner, head brewer at Ellicottville Brewing Company, an introductory hops workshop was presented with over 60 participants. The second annual Hops Production in the Lake Erie Region conference was presented in conjunction with the NYS IPM Program, Chautauqua County Visitors Bureau, the Lake Erie Regional Grape Program and Steve Miller, Hops Specialist with Madison County CCE. The conference was attended by 46 participants from across the Northeast who are either currently growing hops, or were looking to get into the business.
Working in cooperation with Wayne Wilcox (Plant Path), Greg Loeb (Entomology), Andrew Landers (Application Technology), Steve Miller and Mike Helms, PMEP, the first annual Cornell Integrated Hops Production Guide was developed and released in hard copy in 2014.

Using Sensor Technologies for More Accurate Crop Estimation

Terry Bates, Luke Haggerty, Kevin Martin, Rhiann Jakubowski

Crop load management and crop estimation are central factors used to control risk and maintain quality. Sensor technologies have the ability to gather relative vine size, soil, and yield data. The industry-based advisory committee has identified an opportunity to have the Lake Erie Regional Grape Program diagnose problems identified by sensor technologies in grower vineyards as the next critical step toward sensor technology commercialization. In this article we show an example of how sensor data and precision agriculture offer an opportunity to accurately estimate crop and continue to maintain the intensive management control that maximize yields and maintain vine balance. As long as bulk juice prices grow slower than inflation, the industry will depend on sustainable growth of vineyards to allow growers to farm full-time through multiple generations.

Sensor technology and GIS mapping projects continue to capitalize on recent research of sensors and software that gather and aid in the interpretation of vineyard variability. While the GIS Vineyard Mapping Project grew throughout 2014, area grape growers were also educated about the Vineyard Sensor Technology project during Coffee Pot meetings, Grower Conferences, and other various meetings during the season. Growers were encouraged to sign up to have a canopy sensor driven through their vineyards to collect data on NDVI (Normalized Difference Vegetation Index), a measurement of canopy growth, at different stages during the growing season. As sensor technologies takes hold in the region, we have seen increased interest from area growers. Overall, 18 grape growers covering a total of 450 acres accepted the opportunity to have their vineyards sensed. Maps generated from the data collected were implemented into decision making and aided growers in crop estimation practices by showing the visual differences within their vineyard blocks.

Comparing Methods for More Accurate Concord Crop Estimation:

Crop estimation is important at the farm level to make appropriate management decisions on crop adjustment, resource inputs, harvest needs, and harvest scheduling. In 2014, the economic impact of inaccurate crop estimation was also seen at the industry level, where extra costs were incurred for juice storage and shipping because the crop was larger than expected.

In 2014, we compared three different techniques for crop estimation at CLEREL and compared the estimates with the actual harvest weights from the processor scale house and a harvester-mounted grape yield monitor. First, we followed our developed method for sampling the vineyard by clean picking two panels (1% of an acre at our row and vine spacing), weighing the fruit from those two panels, and multiplying that weight by a berry weight factor to calculate a final harvest weight (Figure 1). At CLEREL, we did not address crop estimation until 50 days after bloom (not the typical 30 days after bloom) because of conflicts with other research activities; therefore, we were between 65-70% of final berry weight (not the typical 50% at 30 DAB).

Figure 1: Crop estimation sampling 30-50 days after bloom. Approximately 1% of an acre is clean picked and weighed. The current crop weight is multiplied by a berry weight factor and sample size factor to calculate a harvest estimate in tons/acre. In 2014, crop estimation at CLEREL was done at 50 DAB (August 4, 2014), approximately 65-70% final berry weight, and we used a berry weight multiplication factor of 1.4-1.5 (100/70 = 1.43).

We collected 16 samples over 16 acres of grapes. Typically, this would be done randomly with the hope that the small sample size would accurately represent the whole vineyard. In 2014, canopy sensor measurements (NDVI) were collected at 20, 30, 40, and 50 days after bloom. The 20 DAB NDVI spatial map was used to designate three vine vigor classifications (low, medium, high). The 16 crop samples were stratified across the three classifications (Figure 2) and a mean crop estimate was generated for each classification.

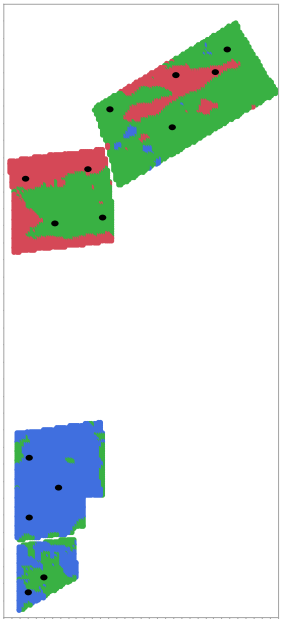

Figure 2: A map of CLEREL vineyards depicting the NDVI generated vigor classifications (colors) and sample locations (black dots).

The harvest crop estimate was calculated three ways: a single mean, three vigor classes, and continuous with NDVI (Figure 3). In the "single mean" method, the average from the 16 vineyard samples (8.57 tons/acre) was simply applied to the total acres (16.12 acres). In the "three vigor class" method, the mean from the samples in the low vigor zone was applied to the acres of the low vigor zone, the mean from the medium vigor samples was applied to the acres of the medium vigor zone, and the mean from the high vigor samples was applied to the acres of the high vigor zone. In the "continuous with NDVI" method, the linear relationship between NDVI and predicted yield in the 16 samples was determined and the mathematical relationship was applied back to the spatial NDVI map to generate a spatial predicted harvest map and overall crop estimate. The harvest estimates were compared to the actual harvest weights collected from a harvester-mounted grape yield monitor calibrated against actual truck weights at the scale house.

The actual yield from CLEREL in 2014 was 133.8 tons (Figure 3 on following page). Using the single mean method and assuming crop estimation was done between 65-70% of final berry weight, the crop estimate was between 138-148 tons (3.3-10.6% high). The three vigor class method estimated between 133-143 tons (0.1-7.2% high) and the continuous method estimated 137-145 tons (2.5-9.8% high). Therefore, using the NDVI generated vigor zones and assuming 70% of final berry weight at 50 days after bloom (a berry weight factor of 1.4) gave the most accurate crop estimate.

Similar to the curve-linear relationship between vine pruning weight and yield, vine yield increased with increasing NDVI values until the canopy was full and maximum light interception was reached. Higher NDVI values did not translate to higher yield. The "three vigor class" method, although coarse with only three means, approximated the actual curve-linear NDVI-Yield relationship more than the "continuous by NDVI" method, which assumed a strictly linear relationship. Therefore, the continuous method overestimated crop size at very high NDVI values.

Although we measured berry weight at crop estimation time and at harvest, it is interesting to note that we did not need berry weight measurements for any of these methods. We used the days after bloom and the standard berry curve in Figure 1 and made the assumption that the berries were 65-70% of final weight.

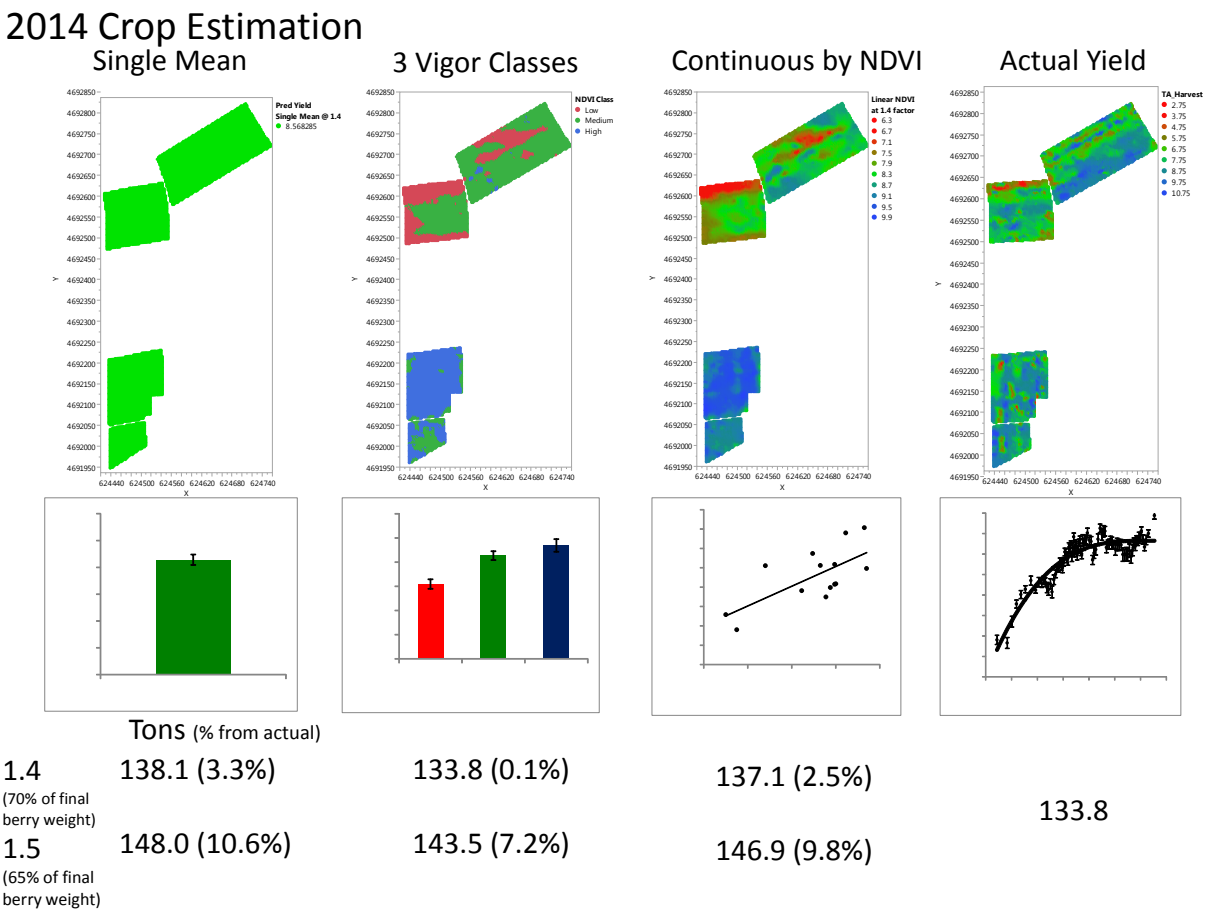

Figure 3: Crop estimation and actual yield maps including the relationships used to calculate the estimates. The numbers represent the harvest tons estimated on 16.12 grape acres and the percent the estimate was off from the actual harvest weight.

Economics of Sensor Driven Crop Estimation:

The commercialization of sensor technology requires a capital investment by the grower. Sensor packages used in this project are commercially available for $13,000. To cover 50% of the acreage in the region with this sensor package a total industry investment of $1.5 million would be required. The industry benefits of using this method of crop estimation, compared with grower results are likely to exceed $1 million in 2014. This is in a year when virtually 100% of the crop reached maturity. The economic impact of sensor driven crop estimation has much greater potential in higher risk years.

As our understanding of sensor technology advances, so do potential uses. The use of sensor technology can decrease the cost of crop estimation by 50% or $2.50 per acre. While the cost of yield estimation is insignificant, a decrease in the labor associated with the practice increases the likelihood that growers will estimate their crop. A grower using NDVI to assist in crop estimation had a final crop size within 3% of their estimate.

For the Lake Erie Region, 2014 crop estimates were 80% of actual. Nationwide averages were 90% of actual. This creates serious financial and production risk to growers. Grower-owned processors incurred significant increases in containment costs that could have been avoided by simply understanding the size of the crop. In the Lake Erie Region, inaccurate crop estimation even resulted in the non-delivery of marketable tonnage. Further, there are also significant production risks associated with over-cropped vines that cannot be remedied unless the grower knows his crop size.

We have identified the $400,000 in costs to the industry. In all likelihood, because of proprietary processor information and return crops for 2014, the actual costs are significantly higher.

Plans for 2015:

This project will continue in 2015, and growers are encouraged to sign up to have their vineyards sensed in the upcoming growing season. We will begin collecting data when the shoots are 10-12 inches long and will start entering commercial vineyards approximately 20 days post-bloom. We are able to gather data up until mid-August.

The main interest is to look for patterns within a block or within uniform management areas 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. Otherwise, the patterns in the NDVI can be used to target sampling (soil, petiole etc.) to identify production-limiting factors in the low vigor areas and, hopefully, remedy these factors.

Successful commercial adoption of sensor technologies requires grower input and participation. Please contact LERGP if you're interested in having NDVI sensors pass through your vineyard or to hear more about the project. Contact Luke Haggerty (716)792-2800 ext. 204, email: llh85@cornell.edu or Kevin Martin (716)792-2800 ext. 205, email: kmm52@psu.edu for questions or to set up and appointment.

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2014 Grape Berry Moth Model Trials in Commercial Concord Vineyards in Erie County, PA

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

Introduction

In 2014, GBM Model demonstration trials were continued in the same commercial Concord vineyards in Erie County, PA. as in previous years. The objectives for this season were to: 1) gain more information to enable fine tuning of the model; and 2) to determine the efficacy of multiple insecticide applications for the second and third generations of GBM.

Methods

A total of six commercial Concord vineyards with high to severe GBM pressure were monitored. Paired comparisons were made between 3 sets of vineyard blocks. Paired sites were chosen within close proximity to each other and with a similar history of GBM pressure. In close collaboration with growers, 3 vineyard blocks were managed using the GBM Model. In the GBM Model blocks the protocol was to regulate both the initial timings and initial choice of insecticides used for each generation, and the number of insecticides applied. The first spray for each generation was initiated according to the timings (810 and 1620 degree days) indicated by the GBM Model in NEWA. These sites were compared to 3 blocks in which the growers determined their management strategies (NO Model).

The GBM Model blocks received 3 - 6 insecticide applications depending on the site. The initial spray applications for the second (810 DD) and third generations (1620 DD) occurred on or within 1 day of the required timings suggested by the model. Site 1 received a postbloom application, which was not recommended, followed by 2 applications which were model directed. Site 2 received 3 applications for both the second and third generations for a total of 6 insecticide treatments. Site 3 received 4 insecticide applications (back to back applications for second and third generations). The NO Model sites received 2 - 3 applications based on the growers' chosen timings. Insecticides, rates and application dates for all sites are contained in ***Table 1***.

Preharvest, destructive sampling was conducted at the 6 vineyards to determine GBM injury levels. A total of 20 clusters from Border Rows (Rows 1 and 2) and 10 clusters from Row 5 were collected at each site. The Incidence (% clusters with any GBM injury), Severity (% berries with GBM injury), and % Missing Berries were recorded.

Results

The data shows that following the GBM Model resulted in overall lower injury levels compared to the NO Model sites. However, in border rows, the Incidence (% clusters with any GBM injury) was still between 80 – 100% at all of the sites. But, more importantly, the % berries with GBM injury (Severity) and % Missing berries were less at all of the GBM Model sites vs. the No Model sites. GBM Model sites 1 and 3 had dramatically fewer injured berries (41.3% and 63.1%, respectively) than the paired No Model sites while site 2 was 9.2% less (***Table 2*** and ***Graph 1***).

Five rows from the border the GBM Model sites had 80% (site 1), 30% (site 2), and 60% (site 3) fewer clusters with GBM injury than the paired No Model sites. In addition, the % berries with GBM injury was also 38.6% (site 1), 15.7% (site 2) and 40% (site 3) less at the GBM Model sites compared to the No Model sites (***Table 3*** and ***Graph 2***).

Discussion

Multiple Insecticide Applications – More than 1 insecticide application for the second and third generations was justifiable this season considering the high GBM pressure throughout the Lake Erie Region. GBM Model sites 2 and 3 both received more than 1 insecticide application per generation. Berry injury levels in border rows where lower by 9.2% and 63.1% compared to the paired No model sites. However, I expected a greater reduction in injury levels at GBM Model site 2 considering that 6 insecticide treatments were applied. The extreme GBM pressure at this site indicates that even multiple spray applications to border rows in severe risk

sites may only reduce injury levels to a certain level. In row 5 at this site, berry injury levels did drop to 7.3%, which was a 22% reduction compared to the border area.

Second Generation GBM - The NO Model growers either did not apply any insecticide for the second generation or inadequately sprayed by applying to the edge of the block and blowing spray into the vineyard. So, by the start of the third generation, GBM populations and injury levels at these sites were already extremely high even before any insecticides were applied. Therefore, it is critical that a properly timed insecticide application is initiated starting at the second generation to alleviate extensive infestations by the end of the season.

Spray Coverage – Results from GBM Model site 2 and the No Model sites also points to another limiting factor for successful GBM management – **Coverage**. Excellent spray coverage, which is critical, is extremely difficult in the late season in Concord vineyards. This is due to the downward growth habit and heavy canopies that exist. Thus, less than optimum coverage coupled with high GBM population levels, results in less than optimum control.

Fine Tuning of the GBM Model – In the 2014 season, management of berry moth using the GBM Model resulted in significantly lower berry injury levels compared to NO Model sites. However, it is important to note that the GBM Model recommendations are not absolute and the model is still evolving. Adjustments are required by researchers and growers (dependent on site specific conditions) to improve the model's efficacy. Data from the 2014 demonstration trial will be discussed with Mike Saunders, Jody Timer, Greg Loeb and Tim Weigle to refine the efficacy of the model.

Table 1 **2014 INSECTICIDE APPLICATIONS**

Site (Blocks)	Spray Date	Insecticide	Rate/A
1 - GBM Model	6/23	Tundra	3.2 oz
	7/12	Brigade 2 EC	3.2 oz
	8/21	Belt SC	4 oz
1 - NO Model	8/18	Belt SC	4 oz
	8/26	Leverage 360	5.4 oz
	9/4	Baythroid XL	3.2 oz
2 - GBM Model	7/12	Belt SC	4 oz
	7/22	Danitol 2.4EC	15 oz
	7/29	Imidan 70W	2 lb
	8/21	Altacor	4 oz
	8/30	Imidan 70W	2 lb
	9/5	Leverage 360	3.2 oz
2 - NO Model	6/21	Sniper	3.2 oz
	8/21	Belt SC	4 oz
3 - GBM Model	7/10	Belt SC	4 oz
	7/22	Danitol 2.4EC	20 oz
	8/20	Intrepid 2F	12 oz
	8/29	Leverage 360	5 oz
3 - NO Model	6/12	Danitol 2.4EC	not provided
	7/14	Danitol 2.4EC	edge spray
	8/11	Swagger	edge spray

Table 2

2014 GBM DD Model Demonstration - (GBM Injury - Border Rows)

Date	Blocks	Protocal (Border)	% Incidence	% Severity	% Missing Berries
9/28	1	GBM Model	80	10.14	5.18
9/28	1	NO Model	100	51.44	9.07
10/2	2	GBM Model	100	29.36	5.5
10/2	2	NO Model	100	38.59	6.26
9/23	3	GBM Model	85	10.19	2.79
9/23	3	NO Model	100	73.25	5.05

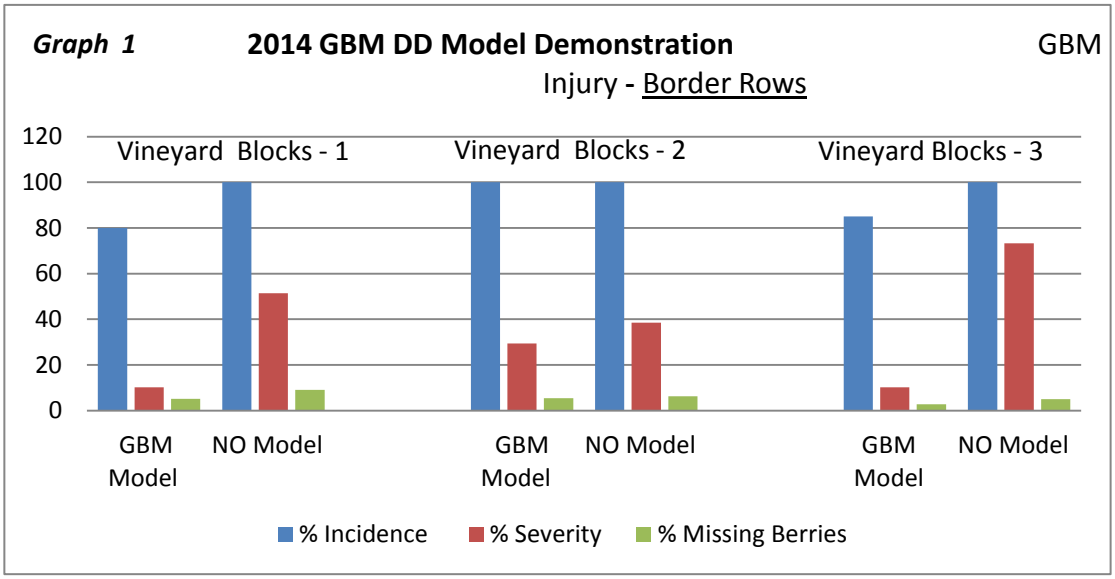
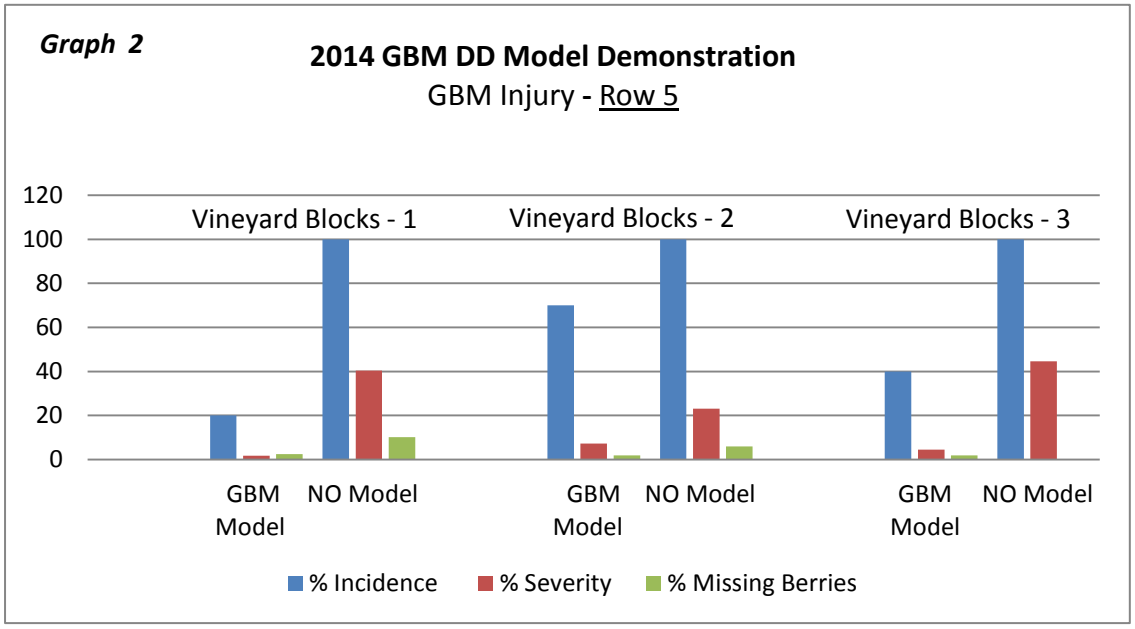


Table 3

2014 GBM DD Model Demonstration - (GBM Injury - Row 5)

Date	Blocks	Protocal (Row 5)	% Incidence	% Severity	% Missing Berries
9/28	1	GBM Model	20	1.73	2.53
9/28	1	NO Model	100	40.38	10.22
10/2	2	GBM Model	70	7.33	1.86
10/2	2	NO Model	100	23.06	5.91
9/23	3	GBM Model	40	4.57	1.83
9/23	3	NO Model	100	44.57	0

Graph 2



2014 Plant Pathology Research and Extension Activities

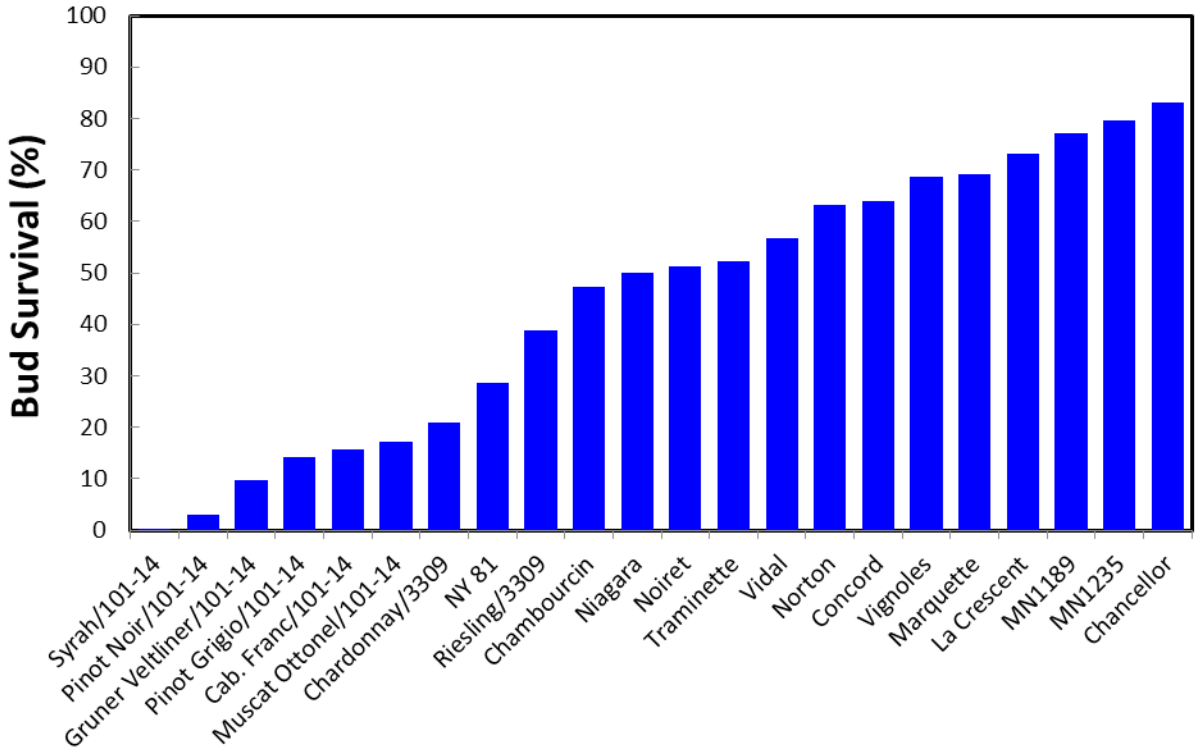
Bryan Hed, Lake Erie Regional Grape Research and Extension Center, Penn State University

Efficacy of pesticide programs without use of CA Prop 65 listed materials. The Safe Drinking Water and Toxic Enforcement Act of 1986, aka California Proposition 65, lists certain chemicals known to the state of California to cause cancer or reproductive toxicity. This list includes kresoxim methyl (Sovran), mancozeb (Dithane, Penncozeb, Manzate, etc), myclobutanil (Rally), captan (Captan, Captec), and carbaryl (Sevin). This project focuses on the development of pesticide programs that eliminate these chemistries without sacrificing pest and disease control. In 2014, disease control in the non-prop 65 programs was generally equivalent or higher than in those relying on mancozeb and kresoxim-methyl. Superior control of powdery mildew was achieved on Concord fruit by substituting Vivando/Ziram for Sovran in the post bloom period. However, the costs associated with non-prop 65 programs in this study were generally higher. For example, Ziram has been priced a little higher than mancozeb products (about $1/A). On Concord, substituting Sovran (about $13/A) with Ziram/Vivando in the post bloom period (about $33/A) represents a substantial additional cost. We plan to examine this again in 2015.

Funding was provided by the Lake Erie Regional Grape Research and Extension Program, Inc.

The development of new cultural and chemical control options for wine grape harvest rot, yield management. Fruit zone microclimate and cluster compactness exert major influences on late season fruit rots of wine grapes. Treatments like prebloom leaf removal, that open the fruit zone to better light, air, and pesticide penetration, while reducing cluster compactness, have consistently reduced the susceptibility and rot of fruit clusters and improve crop quality for winemaking. Early leaf removal can also reduce yields, an attractive prospect on over-productive hybrid wine varieties that require fruit thinning every year (Chancellor, Chambourcin, Vidal, etc). Ongoing evaluations of pre-bloom leaf removal in 2014 revealed that there is potential for this practice to replace expensive fruit thinning. Recent research in Italy offers the prospect of mechanizing pre-bloom leaf removal to reduce labor costs associated with crop thinning.

NE-1020: Multistate Evaluation of Wine grape Varieties and Clones. In its sixth year, this project involves 17 states and is providing valuable information regarding the viticultural characteristics and wine quality potential of many good quality grape cultivars and clones of economic significance throughout the eastern U.S. The Pennsylvania portion of this project is headed by Drs. Michela Centinari and Rob Crassweller of the Horticulture department at Penn State. The planting at the Lake Erie Regional Grape Research and Extension Center, North East, includes 18 varieties (10 hybrids and 8 of *Vitis vinifera*) and will provide valuable information for wine grape producers in the Lake Erie region. For example, data on bud cold hardiness this



year has revealed some sharp differences between our 8 varieties of *Vitis vinifera* on the farm, and the French hybrids. At the Lake Erie Regional Grape Research and Extension Center, old standards like 'Vignoles' and 'Chancellor' and the Minnesota hybrids were the winners, and appeared to fare as good as or better than even native varieties like Concord and Niagara. At both locations, Riesling, though seriously damaged, was generally the winner among the cultivars of *V. vinifera*.

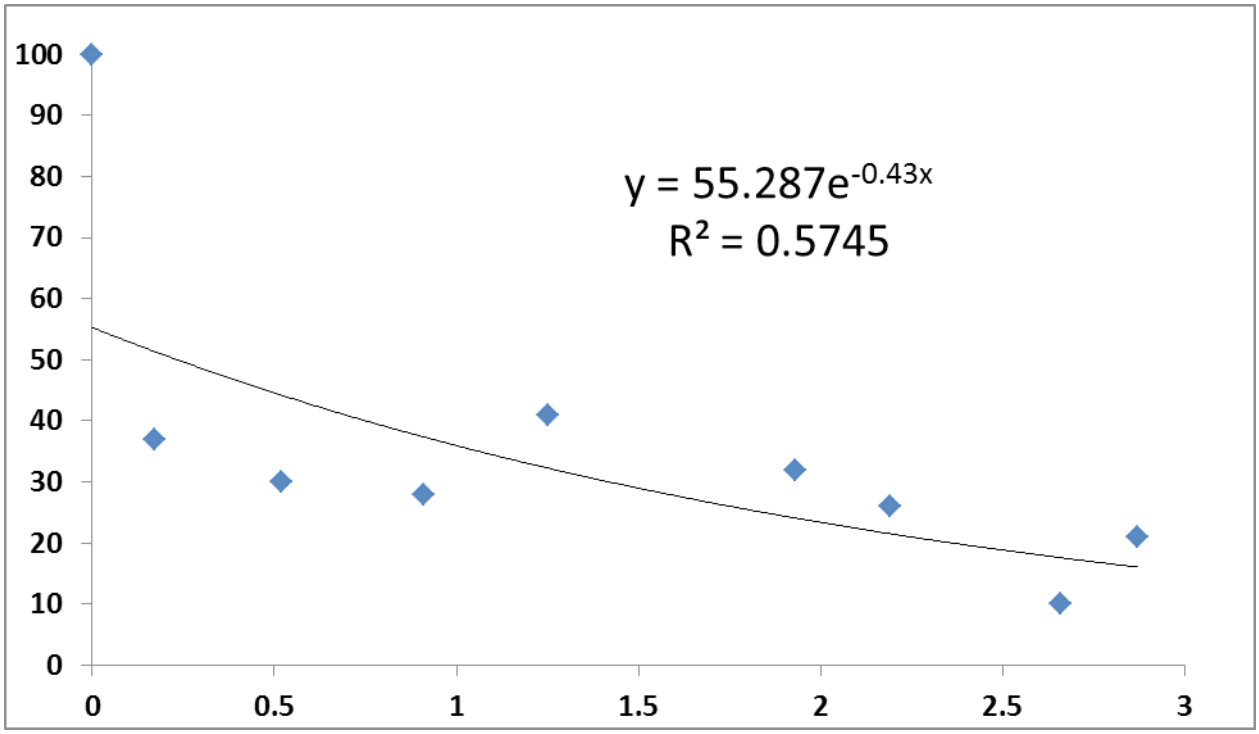
Funding for this project was provided by the Pennsylvania Wine Marketing and Research Board

Monitoring fungicide residue retention on grapes in Pennsylvania: Protectant fungicides like mancozeb are extremely important to the Eastern wine grape industry in the control of black rot and downy mildew of grapes. The development of these diseases is dependent on rainfall events, and the retention of mancozeb on plant surfaces during infection periods is critical to disease control efficacy. A better understanding of how rainfall events affect the retention and efficacy of mancozeb will help growers make more accurate decisions about pesticide applications under varying weather conditions.

Over two seasons: Initial mancozeb deposits from spray applications were greater in 2014 than in 2013 due to improvements made to our sprayer after the 2013 season. The higher initial deposit in 2014 resulted in higher levels of residual mancozeb remaining after subsequent rainfall events, even though rainfall amounts in 2014 were twice those of 2013. So, lesson number 1: better spray efficiency = higher initial deposit = higher residual after subsequent rainfall events, even though rainfall amounts may be higher and the same 4 lb/A rate was applied in both years. In both years, the initial residue is quickly reduced after first rain (by about 60 %) and remaining residue is more tightly stuck. In summary, the first inch of rain (or perhaps just the first rainfall event) appears to remove about 60-70% of the initial deposit, 2 inches of rain removes about 70-80% of the deposit, and 3 inches removes about 80-90% of the deposit.

Relationship between rainfall (in inches; on the x-axis) and % of mancozeb residue (the y-axis) remaining after rainfall. Graph is based on combined ICP results from 2013 and 2014. The equation for the trendline is based on the exponential equation where % remaining residue = $55.287e^{-0.43x}$.

Comparison of analysis methods for mancozeb residue monitoring: Gas Chromatography (GC) is typically used to monitor and analyze residues of mancozeb on plant surfaces. However, this method can be expensive, costing $100 or more per sample. Samples harvested for GC must be kept frozen until processing for analysis,



and there can be loss of active ingredient during storage. On the other hand, Inductively Coupled Plasma mass spectrometry (ICP; the same method used to analyze petiole samples), may be a suitable substitute for detecting and enumerating mancozeb residues by focusing on the presence of manganese in the mancozeb active ingredient. This method is much less expensive, representing a potential cost savings for mancozeb residue analysis in future experiments. Samples for ICP can be dried and stored at room temperature for long periods of time with little concern over loss of manganese from the sample. Over two years, linear regression analysis was used to compare the data drawn from the two methods among matching samples. Ideally, we had hoped for at least a 95 % degree of correlation as shown by the R^2 value. Our results of 2013 surpass that goal: $R^2 = 96.65$ %. The model was also highly significant with $P < 0.000001$, and our linear regression formula was gc = 68.21 + 0.76 icp . However, our results from 2014 were somewhat lower; the resulting $R^2 = 90.5$ %, the model was highly significant with $P < 0.001$, and our linear regression formula was gc = 452 + 0.27 icp. The two methods appear, for the most part, to be interchangeable, and the ICP analysis gave more consistent results from one year to the next.

Funding for this project was provided by the Pennsylvania Wine Marketing and Research Board and the Penn State University.

Efficacy testing of new fungicides. Every season we conduct fungicide trials at the Lake Erie Regional Grape Research and Extension Center (North East) to determine efficacy against the major diseases of grapes. In 2014, we wrapped up two years of testing of an 'alternative' material called Botector that is marketed for control of Botrytis bunch rot. In our trials, Botector has provided little or no control of Botrytis on Chardonnay and Vignoles grapes. On the other hand, cluster zone leaf removal, especially when applied at 'beginning of bloom', provided the best control and was as good as or better than a standard chemical fungicide program. Combining leaf removal with chemical fungicides provided the highest level of control.

Funding for this project was provided by the Pennsylvania Wine Marketing and Research Board.

Coffee Pot and Twilight meeting hosts

Ann & Martin Schulze
John Mason
Leo Hans
Bob & Dawn Betts
Clover Hill Farms
Brant Town Hall
The Winery at Marjim Manor
Chris Ortolano
Dan Sprague
Evan Schiedel/Roy Orton
Tom Tower
Archer & Pratz Inc.
Peter Loretto
Kirk Hutchinson
Earl & Irene Blakely
Fred Luke
Carl Vilardo
Thompson Ag- Twilight meeting and Pig Roast
Erie Coutny Horticultural Society- Gravel Pit Park Twilight Meeting and Chicken BBQ

A sincere thank you to all of those who helped us this past growing season by allowing us to use their barn, building, garage, or home to hold our Coffee Pot and Twilight meetings. Surveys have shown that Coffee Pot meetings are the preferred type of meeting due to the casual atmosphere and opportunity for open forum discussions of timely matters. We held the meetings at various locations throughout Alleghany/Cattaraugus County, Chautuaqua County, Erie County NY, Erie County PA and Niagara County.

These meetings would not be so successful without the help of you, the growers and members of LERGP. Your willingness to host is critical in the success of our Coffee Pot Meetings. I will be scheduling our 2015 Coffee Pots beginning in February. I will be reaching out to find new hosts for 2015. If you have a particular date you are available to host, please let me know so we can get you on the calendar.

2015 LERGP Membership Enrollment-

Greetings to all and Happy Holidays!

It is time to reenroll for the Lake Erie Regional Grape Program. We have an exciting year ahead of us here at the lab, with some new research and extension efforts in the planning. We are planning to have some informative workshops and conferences, and as always, we are here when you have questions or need someone to come to your vineyard.

Benefits of being an LERGP member:

*The Vineyard Notes- our newsletter printed 6-8 times per year
*The Crop Update-our weekly electronic newsletter
*Upcoming events notification, i.e. pesticide recertification and CORE meetings, and workshops.
*Reduced admission to the Grape Grower's Conferences, workshops & meetings
*Free on-site consultation
*Access to field experts and their resources

If you are a Cattaraugus, Chautauqua, Erie, or Niagara county NY resident, own grapes within one or more of those counties, or are a grower that is considered outside of the program area, your avenues for enrollment are the following:

-You may register online via our website using your credit card

-You may print a pdf registration form from the website and mail it in or drop it off, along with your payment

-You may stop in and I can walk you through online registration right in the office

(Niagara County holds its own campaign but also makes enrollment available for growers via our website. The same options listed above are available to you.)

And, of course, you are free to give me a call anytime with questions.
Katie- (716) 792-2800 Extension 201

If you want to enroll in additional programs that the Cattaraugus, Chautauqua County, Erie County, Niagara County CCE offices offer, you will need to do that on their enrollment form.

Please note that the Erie County PA program will still be conducting its own membership renewal campaign. Please renew your membership through the appropriate venue.

2015 Lake Erie Regional Grape Program Enrollment

Fees: *****This form is for NY Growers ONLY- PA Growers call 814-825-0900 to register***

$70.00 $_____ **GRAPE Program** -Chautauqua county landowner
(includes Chautauqua County Ag enrollment)

$65.00 $_____ **GRAPE Program**- Cattaraugus, Erie, NY or Niagara
(includes respective county Ag enrollment)

$100.00 $_____ **GRAPE Program** -Out of Program Region Resident

$25.00 $_____ Hardcopy mailing of Newsletters***

$30.00 $_____2015 Printed Hard Copy of Cornell Guidelines for Grapes-

Program fees do not include 2015 Cornell Guidelines for Grapes-

You can order On-line access or Printed/On-line Bundles at the Cornell Store:
http://store.cornell.edu/c-875-guidelines.aspx

Total $_____ (Please make check payable to LERGP)

I am interested in the educational work of Cornell Cooperative Extension in Niagara, Chautauqua and Cattaraugus County. Any current recorded enrollee 18 years of age and older shall have voting and nominating privileges to hold office in the Association of their local county.

( ) I am 18 years of age or older and signed_____

( )New ( ) Renewal

Farm Name:_____

Name:_____ Spouse's Name: _____

Address:_____ City:_____

State:_____ Zip Code_____

Home phone:_____ Cell Phone :_____

EMAIL ADDRESS_____

Due to budget constraints, all correspondence will be conducted through e-mail. Please provide your e-mail address above. If you would like to receive hardcopies, mark the $25.00 additional fee line above and include with payment.

Please return form and payment to:

LERGP (Attn: Katie)

6592 West Main Rd.

Portland NY 14769

Lake Erie Regional Grape Program

Feel free to call w/ questions:

716-792-2800 Ext 201

Cornell University

PENNSTATE College of Agricultural Sciences

Cornell University Cooperative Extension

2015 LERGP Winter Grape Grower Conference

March 16, 2015
Williams Center at SUNY Fredonia
Fredonia, NY 14063
8:00am-4:00pm

LERGP Member-$50.00
Additional Member same farm- $35.00
Non-Member-$100.00

Come join us for a full day of grape related talks, panel discussions, great food and a chance to catch up with fellow growers.

Registration-7:30am
Talks 8:00-Noon (AM coffee break included)
Lunch-Noon -1:30pm
Talks-1:30pm-4:00pm (PM coffee break included)
Topics TBD

Please direct any questions to:
thw4@cornell.edu, 716-792-2800 ext 203
kjr45@cornell.edu, 716-792-2800 ext 201

Register on-line at: http://lergp.cce.cornell.edu/
You can also print a pdf application at this site to mail in.

LAKE ERIE REGIONAL GRAPE PROGRAM

2015 GRAPE GROWERS' CONFERENCE REGISTRATION FORM

to be held at SUNY Fredonia Williams Center

on Monday,March 16,2015

Deadline for registration is March 10, 2015.

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	$ 35.00
Non- member	$100.00

Additional Attendees:

	$
	$
	$
	$
	$

*Please add a **$25.00 late fee** for each reservation received after March 14, 2014

TOTAL $_____

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

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 201 with any questions.

Thank you for advertising with us this year!
We hope to see you back in 2015.

Cornell Cooperative Extension
LERGP
6592 W Main Rd
Portland NY 14769

6592 West Main Rd., Portland, NY 14769 (716) 792-2800
662 North Cemetery Road, North East, PA 16428-2902 (814) 725-4601
850 East Gore Road, Erie, PA 16509-3798 (814) 825-0900

This publication may contain pesticide recommendations. Changes in pesticide regulations occur constantly, and human errors are still possible. Some materials mentioned may no longer be available, and some uses may no longer be legal. Questions concerning the legality and/or registration status for pesticide use should be directed to the appropriate extension agent or state regulatory agency. Read the label before applying any pesticide. Cornell and Penn State Cooperative Extensions, and their employees, assume no liability for the effectiveness or results of any chemicals for pesticide usage. No endorsements of products are made or implied.

Cooperatively yours,

Timothy Weigle
Statewide IPM
Senior Extension Associate

Andy Muza
County Extension Educator

Kevin Martin
Business Management Educator

Luke Haggerty
Area Viticulture Extension Associate

Contact the Lake Erie Regional Grape Program if you have any special needs such as visual, hearing or mobility impairments.

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