Cornell Cooperative Extension

Lake Erie Regional Grape Program

PennState Extension

Healthy pink bud at CLEREL-

photo credit-Kim Knappenberger

LERGP Newsletter May 28, 2020

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.

In this Issue:

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How to join a Zoom meeting video (1 minute):
https://www.youtube.com/embed/vFhAEoCF7jg?rel=0&autoplay=1&cc_load_policy=1

Joining and Configuring Audio & Video (1 minute):
https://www.youtube.com/embed/HqncX7RE0wM?rel=0&autoplay=1&cc_load_policy=1

The Lake Erie Regional Grape Program is a partnership between Cornell University, Penn State University and the Cornell Cooperative Extension Associations in Chautauqua, Erie and Niagara County NY and Penn State Extension in Erie County PA.



Schedule of events

Virtual Coffee Pot Meetings

10:00 AM Wednesdays: Coffee Pot Meetings hosted by Lake Erie Regional Grape Program

May 6	Topics: Open topic Pesticide Credits: 1 NY and 1 PA Register at: https://cornell.zoom.us/meeting/register/tJYpdeyoqD8uE9LvZWrt3eNpaoI4r7BSFRUx
May 13	Speaker: Dr. Terry Bates – Director of Cornell Lake Erie Research and Extension Laboratory Topics: Soil Health and Nutrition. Pesticide Credits: 1 NY and 1 PA Register at: https://cornell.zoom.us/meeting/register/tJYpdeyoqD8uE9LvZWrt3eNpaoI4r7BSFRUx
May 20	Speaker: Dr. Greg Loeb - Department of Entomology, Cornell AgriTech Topics: Presentation on Insect management for grapes Pesticide Credits: 1 NY and 1 PA Register at: https://cornell.zoom.us/meeting/register/tJYpdeyoqD8uE9LvZWrt3eNpaoI4r7BSFRUx
May 27	Speaker: Dr. Katie Gold Cornell AgriTech School of Integrative Plant Science Plant Pathology & Bryan Hed Research Technologist – Penn State Dept of Plant Pathology and Environmental Microbiology Topics: Early Season Disease Management Pesticide Credits: 1 NY and 1 PA Register at: https://cornell.zoom.us/meeting/register/tJYpdeyoqD8uE9LvZWrt3eNpaoI4r7BSFRUx
June 3	Speaker Heather Leach – Penn State Extension (Entomology) Topics: Spotted Lanternfly Pesticide Credits: 1 NY and 1 PA Register at: https://cornell.zoom.us/meeting/register/tJYpdeyoqD8uE9LvZWrt3eNpaoI4r7BSFRUx
June 10	Speaker: Topic: Open Topic Pesticide Credits: 1 NY and 1 PA Register at: https://cornell.zoom.us/meeting/register/tJYpdeyoqD8uE9LvZWrt3eNpaoI4r7BSFRUx
June 17	Speaker: Dr. Justine Vanden Heuvel Professor School of Integrative Plant Science Director of Undergraduate Studies Viticulture & Enology Cornell University & Dr. Michela Centinari Assistant Professor of Viticulture - Department of Plant Science College of Agricultural Sciences The Pennsylvania State University Topics: Early Season Canopy Management/under trellis floor management Pesticide Credits: 1 NY and 1 PA Register at: https://cornell.zoom.us/meeting/register/tJYpdeyoqD8uE9LvZWrt3eNpaoI4r7BSFRUx

June 24	Speaker: Chris Gerling Extension Associate, Sr., Cornell AgriTech Food Science & Dr. Misha Kwasniewski Penn State Assistant Research Professor Department of Food Science Topics: Enology Discussion Pesticide Credits: 1 NY and 1 PA Register at: https://cornell.zoom.us/meeting/register/tJYpdeyoqD8uE9LvZWrt3eNpaol4r7BSFRUx
July 1	Speaker: Topics: Pesticide Credits: 1 NY and 1 PA Register at: https://cornell.zoom.us/meeting/register/tJYpdeyoqD8uE9LvZWrt3eNpaol4r7BSFRUx
July 8	Speaker: Topics: Pesticide Credits: 1 NY and 1 PA Register at: https://cornell.zoom.us/meeting/register/tJYpdeyoqD8uE9LvZWrt3eNpaol4r7BSFRUx
July 15	Speaker: Dr. Richard Stup - Cornell Agricultural Workforce Development College of Agriculture and Life Sciences and The Charles H. Dyson School of Applied Economics and Management Topics: Labor Relations Pesticide Credits: 1 NY and 1 PA Register at: https://cornell.zoom.us/meeting/register/tJYpdeyoqD8uE9LvZWrt3eNpaol4r7BSFRUx
July 22	Speaker: Topics: Pesticide Credits: 1 NY and 1 PA Register at: https://cornell.zoom.us/meeting/register/tJYpdeyoqD8uE9LvZWrt3eNpaol4r7BSFRUx
July 29	Speaker: Dr. Lynn Sosnoskie – Cornell AgriTech Assistant Professor Weed Ecology and Management for Specialty Crops - School of Integrative Plant Sciences - Horticulture Section Topics: Weed Management Pesticide Credits: 1 NY and 1 PA Register at: https://cornell.zoom.us/meeting/register/tJYpdeyoqD8uE9LvZWrt3eNpaol4r7BSFRUx

ANNOUNCEMENT!

The summer conference has been cancelled due to these uncertain times surrounding the COVID-19 pandemic. Please accept our sincere apologies for the inconvenience and thank you for your continued patience as we continue to try to provide quality programming.

We are truly hopeful that our winter conference will be back on schedule for March of 2021.

The LERGP Team-

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

A Cash Flow Budget Following A Frost

Unusual Challenges For Mature Businesses

2020 is not 2012. The recent frost damage stings but should not change any long-term strategy. While farms can be challenged by cash-flow issues, the recent frost damage should not have that impact on juice grape growers. New businesses, regardless of competitive advantage and profit margins can be challenged by cash flow. Many farms in the Lake Erie region do not normally face cash flow issues. Recent survey results indicate that these businesses tend to be mature, conservatively investing capital and usually not growing.

2020 – Revenue and Expenses

Frost and freeze damage in 2020 should not impact grower revenues significantly. The only exception will be for growers in the hardest hit areas that do not carry crop insurance. Even those growers, hopefully they are in the business of farming secondary buds. That leaves only the few growers that implement no risk management strategy for frost as growers that make have issues. For some growers, revenue may still be up. Crop insurance claims often pay more in the year of the disaster than the crop itself would return. Long-term payments, of course, are usually less. If management strategies change slightly because growers are using a line of credit to plug the hole in their cash flow, changes should be carefully considered. Before decisions like that are made, taking a look at your cash flow picture is the place to start.

It is important to look at your individual financial situation and not rely on the advice of other growers. The collective knowledge of the industry can be overwhelmingly helpful. In this situation, however, individual variables dramatically change the cash flow picture from operation to operation.

The pinch of a frost even occurs in later years. The grapes lost today is profit lost in 2021 and beyond. In nearly all instances, it is likely that the frost alone will change few practices. The frost may motivate growers to implement cost cutting strategies that are already recommended, but not adopted.

For example, a grower may reduce nitrogen applications if frost damage is severe. A grower following recommended practices may save $5 per acre. A grower that is regularly applying 150 pounds of actual N per acre, might save $50 per acre. That same grower is able to reduce N applications whether there is a frost or not. The frost saves the grower $5. The recommended practice saves the grower $45.

Mechanized pruning with hand follow-up is another recommended practice. If the frost motivates a grower to implement the practice, the impact on cash flow is due more to the adoption of a practice than it is caused by frost.

In total, growers following recommended practices can save about $125 per acre. Of that, $100 is cash savings that do help slightly prepare for 2021 cash-flow concerns. Cost savings directly related to frost, could potentially include immediate reductions in nitrogen, late season disease control,

potassium maintenance rate applications.

Revenue 2021 (2020 Crop)

Cash flow is not going to be a problem, at least as it relates to frost, until 2021. If we forecast those issues now, we can get out in front of the management strategy and avoid cutting expenses that shouldn't be cut.

Revenue in 2021 may look a lot different for Cooperative growers with severe damage. Those growers that have crop insurance will realize substantially higher revenue in the 2020 crop, prior to incurring expenses for the 2021 crop. Growers in this group should be more concerned with tax planning than cash flow issues.

More broadly, growers that have crop insurance will be able to cover all operating expenses in 2021. Average yields are up and prices also remain above average. Growers that have debt and salary payments to make will also be able to do so with crop insurance revenue, if they have higher levels of coverage. Many growers will continue to generate revenue in excess of $2,000 per acre, despite the frost. A typical grower will earn at least $1,300 per acre in 2020, whether it comes from crop insurance or crop payments. That revenue will be enough to cover operating costs for 2021.

Production Expenditures

Expenses can also vary considerably, though should not vary as significantly as revenue. The biggest variability should be in mechanization of crop load. Through May expenses have likely been realized for pruning, trellis maintenance, and renewals. One should target $120 for minimally pruned vineyards.

2021 Crop expenses will vary from a low of $550 and $850 per acre. This variance assumes recommended practices are followed. Pruning style, soil health and disease pressure are key variables that will impact costs in the 2021.

Table two shows the expenses realized through May 1st. Another total, for sake of comparison is provided to show expenses just prior to harvest. Costs may vary somewhat more for smaller growers. These small growers may not have a berry moth "hot spot". That hot spot might be their entire farm.

An extreme example, growers with no crop and CAT insurance would be able to cover 75% of cash expenses. A crop loan, of approximately 15,000 would be necessary. If that grower were a cooperative member, a line of credit would be recommended. Growers with severe damage in 2020 can consider mechanization in 2021. This would ease any burden on cash shortages. It also integrates nicely into a risk management plan for a 2021 crop.

Leveraged and Salary Expenditures

For growers that have leveraged their investment or draw a salary the cash flow budget is much more challenging. Many business owners vary salary draw considerably, in particular when a household has two incomes.

If a salary is required, even a modest one of forty thousand requires a 60% increase in expenditures. Drawing that salary would either require a moderately high level of crop insurance or credit. It is a perfectly acceptable business practice to draw a salary. However, if it is something you require, it is

another reason to think of crop insurance as a mandatory expense.

Even a highly leveraged grower of one hundred acres probably does not have more than five hundred thousand in debt. Interest payments for the year should total between twenty and thirty thousand. Principle payments may be adjusted, depending on the lender. Total loan expenses should not exceed 35,000 on this type of farm. This kind of leveraging allows a younger grower to enter the business. The cash flow budget reveals the additional risk realized with higher debt levels. Again, this is a reason to consider high levels of crop insurance. Without it, the typical grower would have to increase debt (if possible) to make it through the year.

Other cash flow variations

While a great number of variables can slightly change cash flow, the previously considered capture most variation. Of an important note, of course is the baseline. The purpose of a cash flow budget is not to determine profitability. It does not determine the long-term sustainability of your operation. It is merely a forecast illustrating the ability of a business to make required purchases at particular points in time.

The largest variability that cannot be assessed across the industry, only on individual farms, is the amount of cash on hand prior to the beginning of 2020 crop payments.

Outlook

As discouraging as a frost can be, a single event is not a threat to the business. Many growers may not even see an impact on cash flow as a result of a minor frost event. This cash flow budget does articulate the challenges facing younger growers. With nearly half of all growers eligible to collect SSI, leveraging and required salary distributions are the exception. Younger growers are much more likely to require both a salary and large debt payments. Those growers, if they have not had a chance to build equity, face the greatest risk. If those growers do not have crop insurance, they should for 2021. Crop losses on consecutive years can be a challenge for the best growers.

NEW YORK STATE | Department of Health

NY FORWARD SAFETY PLAN TEMPLATE

Each business or entity, including those that have been designated as essential under Empire State Development's Essential Business Guidance, must develop a written Safety Plan outlining how its workplace will prevent the spread of COVID-19. A business may fill out this template to fulfill the requirement, or may develop its own Safety Plan. **This plan does not need to be submitted to a state agency for approval** but must be retained on the premises of the business and must made available to the New York State Department of Health (DOH) or local health or safety authorities in the event of an inspection.

Business owners should refer to the State's industry-specific guidance for more information on how to safely operate. For a list of regions and sectors that are authorized to re-open, as well as detailed guidance for each sector, please visit: **forward.ny.gov**. If your industry is not included in the posted guidance but your businesses has been operating as essential, please refer to ESD's **Essential Business Guidance**. Please continue to regularly check the New York Forward site for guidance that is applicable to your business or certain parts of your business functions.

COVID-19 Reopening Safety Plan

Name of Business:

Industry:

Address:

Contact Information:

Owner/Manager of Business:

Human Resources Representative and Contact Information, if applicable:

I. PEOPLE

A. Physical Distancing. To ensure employees comply with physical distancing requirements, you agree that you will do the following:

- [ ] Ensure 6 ft. distance between personnel, unless safety or core function of the work activity requires a shorter distance. Any time personnel are less than 6 ft. apart from one another, personnel must wear acceptable face coverings.

- [ ] Tightly confined spaces will be occupied by only one individual at a time, unless all occupants are wearing face coverings. If occupied by more than one person, will keep occupancy under 50% of maximum capacity.

NY Forward COVID-19 Business Safety Plan
Produce and Cut Flower Operations
[Best Practices]

Business Contact Information

Name of Business:
Industry:
Address:
Contact information:
Owner/Manager of Business:
Human Resources Representative and Contact Information, if applicable:

I. People

A. Physical Distancing

"Ensure 6 ft distance between personnel, unless safety or core function of the work activity requires shorter distance"

"Any time personnel are less than 6 ft. apart from one another, personnel must wear acceptable face coverings."

Workers will maintain a minimum of 6 ft. distance from each other whenever possible.

Notes:
Because SARS-CoV-2 is believed to be spread primarily via respiratory droplets in areas where people are in close contact, physical distancing is vital to prevent outbreaks on the farm. While SARS-CoV-2 is also transmitted by touching contaminated surfaces, it is considered to be a secondary mode of transmission. Therefore, separating workers and wearing fact coverings should be a priority on the farm this season.

Plan for Field Operations: This crisis requires re-thinking how work gets done in the field. Consider the flow of workers on your operation: Look at how a task gets done and how it can be done another way. In the past workers may have worked in pairs or groups – can they work alone now? When distance cannot be maintained, is there a protocol for proper use of face coverings? New protocols necessitate good communication with workers and adaptation as you go.

Examples:

- In fields, workers will be spaced to allow for appropriate physical distancing. Workers will not work alongside each other in the same row, or adjacent rows when planting or harvesting, etc.
- Workers will not sit close to each other at lunch or during breaks
- Workers sitting alongside each other on a mechanical transplanter will wear masks

"For any work occurring indoors, restrict workforce presence to no more than 50% max occupancy for a particular area as set by the certificate of occupancy, excluding supervisors in this calculation, unless a facility requires more employees to safely operate core functions…"

"Tightly confined spaces (e.g. supply, equipment, […] and vehicles) should be occupied by one

individual at a time, unless all occupants are wearing face coverings. If occupied by more than one person, keep occupancy under 50% of maximum capacity."

Numbers of workers indoors at the same time will be reduced to a maximum of 50% occupancy. Whenever possible, workers will travel to worksites singly.

Notes:
Avoiding multiple workers in small spaces is critical, given that SARS-CoV-2 is transmitted via respiratory droplets in the air. Ensuring ventilation is essential: open windows or doors in buildings whenever possible. Roll up sides of high tunnels when workers are present.

Plan for Transportation: Transportation between work sites is problematic for maintaining distances. The Cornell Institute for Food Safety has some guidance for transportation. Guidance includes: Disinfect and wipe down frequently touched surfaces before and after use; Passengers sit as far apart as possible; Use more vehicles so there is more space between passengers; Passengers enter and exit one at a time; Wear face coverings.

Plan for break times: Numbers of workers present in breakrooms, wash/pack areas, offices, greenhouses, sheds, and other buildings should be limited to the extent possible. Stagger break times between crews, or set up multiple break sites outdoors.

"Post social distancing markers using tape or signs that denote 6 ft. of spacing in commonly used and other applicable areas on the site (e.g. stables, health screening stations)."

Taped "X's" on the floor will be used to indicate 6 ft distances for standing in high traffic areas, including at health check points or in lines to use time clock.

"Limit in-person gatherings as much as possible and use tele- or video-conferencing whenever possible. Essential in-person gatherings (e.g. meetings) should be held in open, well-ventilated spaces with appropriate social distancing among participants."

Workers will not gather while performing work activities or during breaks on farm. In lieu of in-person instruction, supervisors and workers will talk via telephone or Facetime/WhatsApp/Google Hangouts/ radios/etc. When in-person instruction is necessary, workers will meet outdoors and will be distanced >6ft away from each other. If indoor in-person meetings are necessary, workers will maintain physical distancing and will wear face coverings.

Notes:
Plan for alternative worker meetings: Many farms have in-person crew meetings to start the day and provide instruction to workers. To the extent possible, leverage technological resources to communicate with employees rather than meeting in-person. You may consider revising your cell phone use policy, if you have one already in place. Workers should wash their hands or use hand sanitizer after using their cell phones.

"Establish designated areas for pick-ups and deliveries, limiting contact to the extent possible"
Pick-up and delivery locations will be located away and outside of busy areas of the farm, such as wash/pack areas and offices. Delivery service workers and customers will leave or pick up packages and product in a less-trafficked area in a no-contact manner.

Notes:
Plan for off-farm visitors: Many farms are adopting “contactless” pick up and delivery options for customers interested in purchasing fruits and vegetables direct from the farm. As much as possible, farms should strive to limit outside visitors on farms coming into contact with farm workers. Additionally, a farm should have a visitor policy in place, which should include a visitor log, and instructions for wearing PPE, and other farm-specific information. A farm should consider keeping disposable masks on hand for delivery people or service providers that must spend time on the farm working near employees.

II. Places

A. Protective Equipment

“Employers must provide employees with an acceptable face covering at no-cost to the employee and have an adequate supply of coverings in case of replacement.”

“Acceptable face coverings include but are not limited to cloth (e.g. handmade sewn, quick cut, bandana) and surgical masks, unless the nature of the work requires stricter PPE (e.g. N95 respirator, face shield).”

“Face coverings must be cleaned or replaced after use or when damaged or soiled, may not be shared, and should be properly stored and discarded.”

Each worker will be provided with, or have the option to provide their own, cloth or disposable face covering. Workers will not share face coverings, and face coverings must be clean prior to each use.
Plan for Personal Protective Equipment: Many growers are procuring or attempting to procure cloth face coverings for employees. Cloth face coverings do not make social distancing unnecessary, but they lower the chance for infection. They are a good idea in situations where distancing is difficult to maintain, such as in transportation. At the moment commercially-made cloth masks are in short supply. Local community groups and artisans are making these coverings, or it may be possible to contract the work locally. Many reusable cloth masks have been distributed at local Cornell Cooperative Extension offices. Contact your county office for more information.

Additional Resources:
The CDC has detailed instructions on making sewn or “no-sew” cloth face coverings: https://www.cdc.gov/coronavirus/2019-ncov/downloads/DIY-cloth-face-covering-instructions.pdf

“Limit the sharing of objects (e.g. tools, machinery, vehicles) and discourage touching of shared surfaces; or, when in contact with shared objects or frequently touched areas, wear gloves (trade-appropriate or medical); or, sanitize or wash hands before and after contact.”

When possible, workers will not share tools or other objects that are touched. Workers will practice frequent hand washing, specifically before and after using shared objects. [You may also include a statement regarding your glove use policy].

Notes:
Think through tasks on the farm that require tools and other objects that are touched. You may consider assigning each worker their own set of tools to use for the season, for example, pruning shears, weeding hoes, etc. When this is not feasible, make sure that employees have cleaning and sanitizing materials readily available to use where tools are put away at the end of the day. If vehicles

are shared, keep a spray bottle of disinfectant or wipes in the glove box to wipe down the steering wheel and touched surfaces.

Plan for glove use: Gloves can sometimes provide a false sense of security, and need to be used carefully to prevent cross contamination in the workplace. Gloves to not replace handwashing; hands should be clean prior to putting on gloves. Remove gloves prior to using the restroom, eating, drinking, or smoking. Replace gloves whenever they may be contaminated, such as when they become soiled, after touching your face, or if they are ripped. Reusable or cloth gloves must be laundered or otherwise cleaned frequently.

Additional information:
Proper glove use:
https://extension.psu.edu/proper-glove-use-to-prevent-contamination

B. Hygiene and Cleaning

"Adhere to hygiene and sanitation requirements from the Centers for Disease Control and Prevention (CDC) and Department of Health (DOH) and maintain cleaning logs on site that document date, time, and scope of cleaning."

Restrooms, break areas, food contact surfaces, common touch points, and other high-risk surfaces and shared objects will be cleaned and sanitized frequently, as needed based on farm standard operating procedures (SOP's).

Notes:
Plan for cleaning, sanitizing, and disinfecting: Many farms already have procedures in place for housekeeping, cleaning, and sanitizing. For example, food safety requirements for GAPs and FSMA already require cleaning of food contact surfaces. Implementing SOP's for cleaning, along with a convenient record keeping system will help ensure that the tasks are accomplished.

Additional Resources:
Cleaning vs. Sanitizing fact sheet, by the Produce Safety Alliance
https://producesafetyalliance.cornell.edu/sites/producesafetyalliance.cornell.edu/files/shared/documents/Cleaning-vs-Sanitizing.pdf

The National Good Agricultural Practices (GAPs) Program has many SOPs and log sheets available for download that can be easily customized for your operation, including logs for cleaning restrooms, cleaning and sanitizing tools, and more:
https://gaps.cornell.edu/educational-materials/decision-trees/log-sheets-sops/#sanitation

"Provide and maintain hand hygiene stations for personnel, including handwashing with soap, water, and paper towels, as well as an alcohol-based hand sanitizer containing 60% or more alcohol for areas where handwashing is not feasible."

Workers are provided with hand washing facilities in X, Y, and Z. As per worker training and expectations, employees are responsible for washing their hands before handling fresh produce, and after eating, drinking, smoking, using the restroom, handling animals, or otherwise when they are soiled. [Mention hand sanitizer use here, if applicable.]

Notes:
Plan for handwashing access: Alcohol-based hand sanitizer is not a substitute for hand washing with soap and water. Employees will wash their hands more frequently when hand washing stations are more readily available. Consider building a low cost hand washing station (see Additional Resources) to install in the field for workers to use. Although washing hands with soap and water is preferable, there are situations where hand washing stations aren't available, and quick use of hand sanitizer is convenient and necessary. Consider supplying each worker with their own personal-sized bottle of hand sanitizer. Hand sanitizer 2 oz. and gallon bottles are available to farms for free. Contact your local Cornell Cooperative Extension county office for more details.

Additional Resources:
How to build a low-cost handwashing station:
file:///C:/Users/eh528/Downloads/Build%20Handwashing%20Station%2012-16-19%20(1).pdf

"Provide and encourage employees to use cleaning/disinfecting supplies before and after use of shared and frequently touched surfaces, followed by hand hygiene."

"Conduct regular cleaning and disinfection at least after every shift, daily, or more frequently as needed, and more frequent cleaning and disinfection of shared objects (e.g. tools, machines, control panels, keypads) and surfaces, as well as high transit areas, such as restrooms and common areas." "Cleaning and disinfecting the site, shared surfaces, and other areas, as well as equipment and tools, should be performed using Department of Environmental Conservation (DEC) products identified by the Environmental Protection Agency (EPA) as effective against COVID-19."

"If cleaning or disinfection products or the act of cleaning and disinfecting causes safety hazards or degrades the material or machinery, personnel should have access to a hand hygiene station between use and/or be supplied with disposable gloves."

Commonly touched surfaces and high traffic areas will be cleaned and disinfected frequently using products listed on EPA List N.

Notes:
Plan for disinfectant product use: This spring, the EPA released a list of products for use against SARS-CoV-2 ("List N"). Many common household cleaners are on the list, such as bleach and many others. Consider using a products from List N to disinfect commonly touched surfaces and other high risk areas, such as kitchens and restrooms. Before using any disinfectant, be sure to read the label. Follow the label's guidance for product use, including necessary contact time on surfaces for disinfection, and whether or not the surface needs to be rinsed with water afterwards to remove residues.

Additional Resources:
EPA "List N": Disinfectants for Use Against SARS-CoV-2
https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2

"Prohibit shared food and beverages (e.g. buffet-style meals)."
Workers living separately (not a family or part of the same household) will not share meals.

C. Communication

"Affirm you have reviewed and understand the state-issued industry guidelines, and that you will

implement them."

Notes:
Employers should read guidelines posted for their business on forward.ny.gov

"Post signage throughout the site to remind personnel to adhere to proper hygiene, social distancing rules, appropriate use of PPE, and cleaning and disinfecting protocols."

"Establish a communication plan for employees, visitors, and clients with a consistent means to provide updated information."

Signs will be posted in restrooms, in break areas, at customer points of entry, and other areas to address proper handwashing, recognizing COVID-19 symptoms, proper use of face coverings, importance of physical distancing, and to illustrate SOPs for cleaning and sanitizing tools to employees, customers, and visitors. Employees will receive refresher trainings on safety measures every X weeks/days.

Notes:
For most of us, the COVID-19 pandemic is unlike anything we have experienced in our lifetime. Guidelines and expectations are constantly evolving as new information becomes available. Frequent communication with employees will be necessary to make sure workers understand how to manage risks and make new safety measures a habit.

Because literacy can vary between employees, signage with photos work well to illustrate important concepts. While many signs are available for download and printing, consider making your own signs to illustrate your farm's specific SOPs with photos from your farm.

Additional Information:
The Institute for Food Safety at Cornell University has many links to downloadable signs in English, Spanish, and other languages from the CDC and other agencies on hand washing, physical distancing, COVID-19 symptoms, proper use of face coverings, cleaning and sanitizing, information for consumers, and much more:

https://instituteforfoodsafety.cornell.edu/coronavirus-covid-19/infographics-and-posters/

"Maintain a continuous log of every person, including workers and visitors, who may have close contact with other individuals at the work site or area; excluding deliveries that are performed with appropriate PPE or through contactless means."

The employer will keep records of employee and off-farm visitors present on the farm each day using copies of worker clock in and clock out times and visitor logs.

"Train all personnel on new protocols and frequently communicate safety guidelines."
"If a worker tests positive for COVID-19, employer must immediately notify state and local health departments and cooperate with contact tracing efforts, including notification of potential contacts, such as workers and visitors who had close contact with the individual, while maintaining confidentiality required by state and federal law and regulations."

"Conspicuously post completed safety plans on site."

A copy of the farm COVID-19 Safety Plan will be posted on bulletin boards in farms stores, product pick up sites, employee break areas, and/or office spaces.

III. Process

A. Screening

B. Contact tracing and disinfection of contaminated areas.

IV. Other

Viticulture

Jennifer Phillips Russo, Viticulture Extension Specialist, LERGP

Big Dig Study of Vine Nutrient Content

A Hatch funded project titled: Seasonal Balances and Distributions of Growth, Nutrients, and Carbohydrates in Mature Concord Grapevines was conducted by Terry Bates, Alan Lakso, Martin Goffinet, Richard Dunst, and Lailiang Cheng and coined “The Big Dig”. This study aimed to analyze the total nutrient concentrations in the major organs of mature grapevines removed or “dug up” from a mature Concord vineyard (over 25 years of age) throughout the growing season. Grapevines were completely excavated at 10 different growing points in the season and the major organs analyzed for dry weight and nutrients. The entire vine from roots to fruits was examined. I am going to share some of the findings with you.

Before we get into the meat of the data, let’s set the stage for understanding. The following is a table of all of the 10 growing stages when whole vines were extracted and analyzed to help guide understanding in the following data.

Table *1*. Big Dig Study Excavation Stage, Date, and Description of Stage

Stage Number “Digs”	Date	Stage Description
D1	November 19th	Dormant 02 year-begin
D2	April 10th	Early April
D3	May 6th	Bud Break
D4	May 28th	10 Inch Shoots
D5	June 24th	Bloom
D6	July 8th	Bloom plus 15 days (+15)
D7	July 22nd	Bloom plus 30 days (+30)
D8	August 26th	Veraison
D9	October 7th	Harvest
D10	November 18th	Dormant 03 year-end

Next, let’s go over all of the ten major organs of the vine that were analyzed:

1. Pruning dried weight (kg)
2. Thin Roots
3. Thick Roots
4. Shank
5. Trunk & Cordon
6. 2 year-old wood
7. 1 year-old wood
8. Shoots
9. Leaves
10. Fruit

From this point on, I will refer to each of the “Digs” as the corresponding D and #. For example, if I want to talk about the nutrient concentration in the of N in the organs during Bloom, then I will write D5. Okay, so what I want to share with you is the movement of the nutrients and the timing of when the vine uses stored versus soil nutrient acquisition. It is my hope to help growers to understand timing of nutrient applications corresponding with the vine’s uptake in order to increase efficiency and decrease leaching.

This particular study analyzed Macro and Micronutrients. I am going to focus on the Macronutrients: Nitrogen (N), Phosphorus (P), Potassium (K), Magnesium (Mg), and Calcium (Ca). For the sake of this article, I am going to consider the Dormant 02 year-begin stage (D1) the starting point of the experiment. It was mid-November and the vine has stored nutrients from the previous growing season. The following graphs were created from this study’s data. If you look at the color legend in the upper right-hand side of the graphs, each vine part has a corresponding color assigned to it. On the horizontal axis (X-axis), are each of the excavation stages D1-D10 that represent the different growing points throughout the season. The vertical axis (Y axis) is the amount of that nutrient in the vine at that time, for instance in the Big Dig : Nitrogen graph, the N is measured in grams (g).

It is important to mention that the average fruit yield in this study was around 10 tons/acre. At the normal fruit harvest time point (D9), the sample vines ranged from 7.8 to 13.1 tons/acre.

Let’s look at the Nitrogen graph below (Figure1). When just focusing on N total vine content, you notice that D8 (veraison) bar is the highest. That means that at the time of veraison, the grapevine held the most amount of nitrogen for the growing season. Now if you focus on the different color blocks within each bar, you will notice that the largest amount of color blocked out for the stages D1, D2, and D3 is dark green, which corresponds to the thick roots nutrient content. That implies that the thick roots are a major storage of nitrogen during the dormant to bud break stages. The other large storage organs for N at those early stages are the thin roots, trunk & cordon, and shank, which happen to be all of the woody perennial tissues. I hope that walking you through this helps with the understanding going forward.

There is a decrease of N in grams in the thick roots starting at D4 (10 inch shoots) and it doesn’t increase again until D8, or veraison. When the thick roots decrease in N the shoots, leaves, and fruit increase in N, implying that the during the early stages the nitrogen stored in the larger color block regions was used for new growth and reproductive organs (fruit). Okay, so when looking at the N graph, the total amount of N in the bar for D4-D8 is more than the initial amount at the beginning of the season. That is when the vine must access nutrients from the soil. This is where the timing of nutrient application becomes very important.

At veraison, the fruit softens and ripens, and this is also when the most nitrogen is located in the total vine. Note the N graph, where D8 is the tallest bar at almost 50 grams of N. D9 is harvest and N has begun to decrease. Dormant 03 year-end, D10, the plants total N is less than half of what it was at veraison, because the fruit N was harvested, and the leaves have fallen off the vine. The nitrogen begins to accumulate in the thick roots again, building the storage needed for next year’s new growth.

Terry pointed out, that the perennial tissue is not zero for N. Why can’t shoot growth continue on reserves until well after bloom?

Think about it from the vine without human intervention. Use stored reserves to build new roots and shoots in the spring. Use new roots and shoots to get the new nutrient and sunlight resources you need.

The team also tracked fertilizer uptake and observed that N was being acquired from the soil prior to bloom. This is probably driven more by fine root growth and new shoot growth (transpiration stream). This data demonstrates that Nitrogen applications would benefit the plant from D4 (10 inch shoots), where it starts to decrease but is necessary for commercial plant growth, to before veraison (the highest amount of total N in the plant). **This is why we recommend N applications two weeks before bloom and up to four weeks after bloom in a commercial vineyard setting.**

Now that you can visualize vine organ nutrient content, try your skills on the other macronutrient graphs.

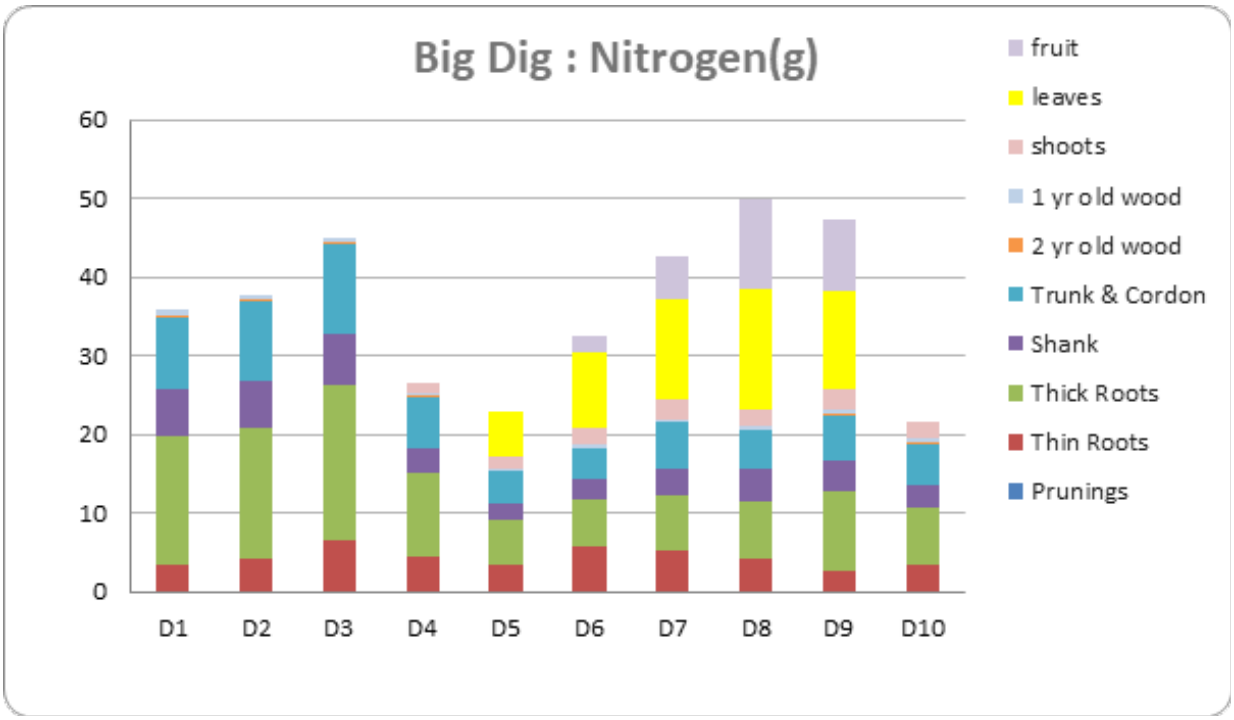

Figure *1*. Big Dig Total Nitrogen Content in Plant Organs per Growing Point

Now that you can visualize vine organ nutrient content, try your skills on the other macronutrient graphs. Look at Phosphorus, what part of the growing season does the vine have the most P (look for the tallest bar also in grams). D8, or veraison, has more than 8 grams of P in the vine. Now look to see which color block in D8 has the most P in it. The purple block, or fruit has the highest amount of P of all of the organs and it spans over 2 grams. Now note the differences in the Y axis (vertical) for both the Nitrogen and Phosphorus graphs. Nitrogen goes from 0-50 grams and Phosphorus from 0-10 grams total weight. The same pattern of larger quantities of P in storage organs of thick roots, fine roots, and trunk & cordon apply as described earlier for N.

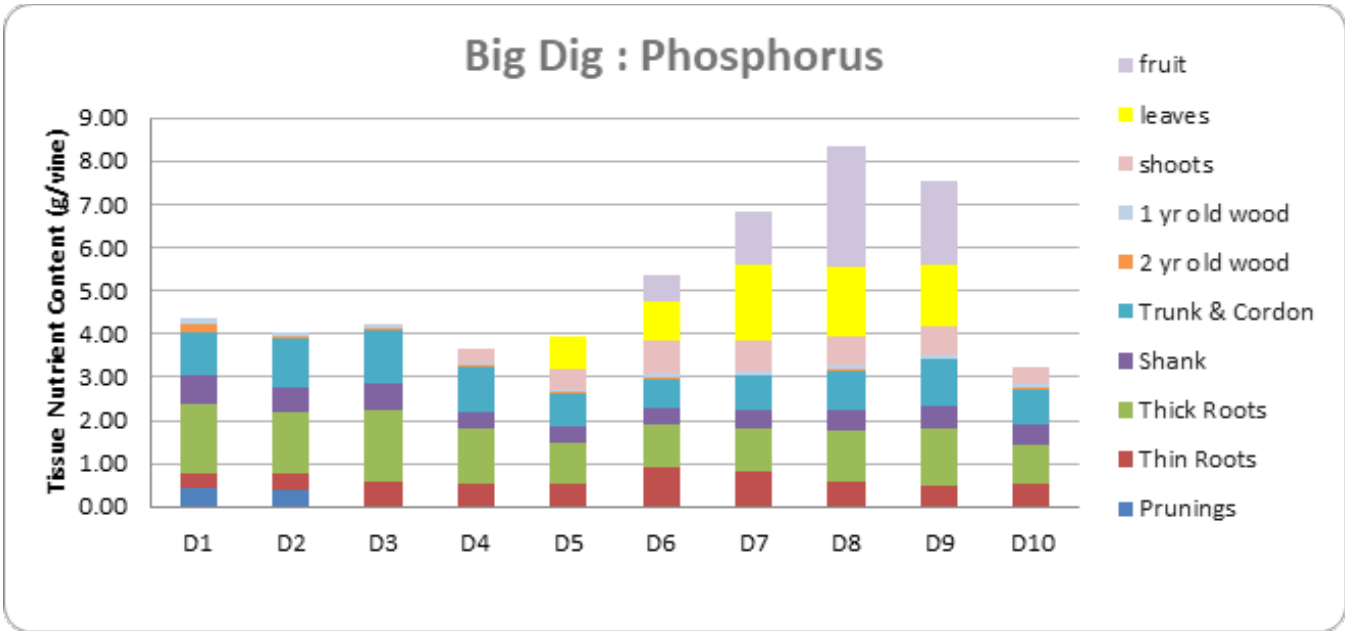

Figure *2*. Big Dig Total Phosphorus Content in Plant Organs per Growing Point

The potassium (K) graph details that the nutrient content of the vine dips below the starting D1 amount of just over 20 grams as the plant begins its growing season and continues to decrease until bloom. This implies that the early season growth uses stored K to begin the season and then needs to obtain is from the soil just before bloom and continues to accumulate in the plant until veraison with slight decreases to harvest. The vine more than doubles its K nutrient concentration compared to the beginning of the season. Looking at that graph, you can see that the vine needs to have K available for it in the soil before bloom. It is also important to note that the potassium Y axis ranges from 0-60 grams.

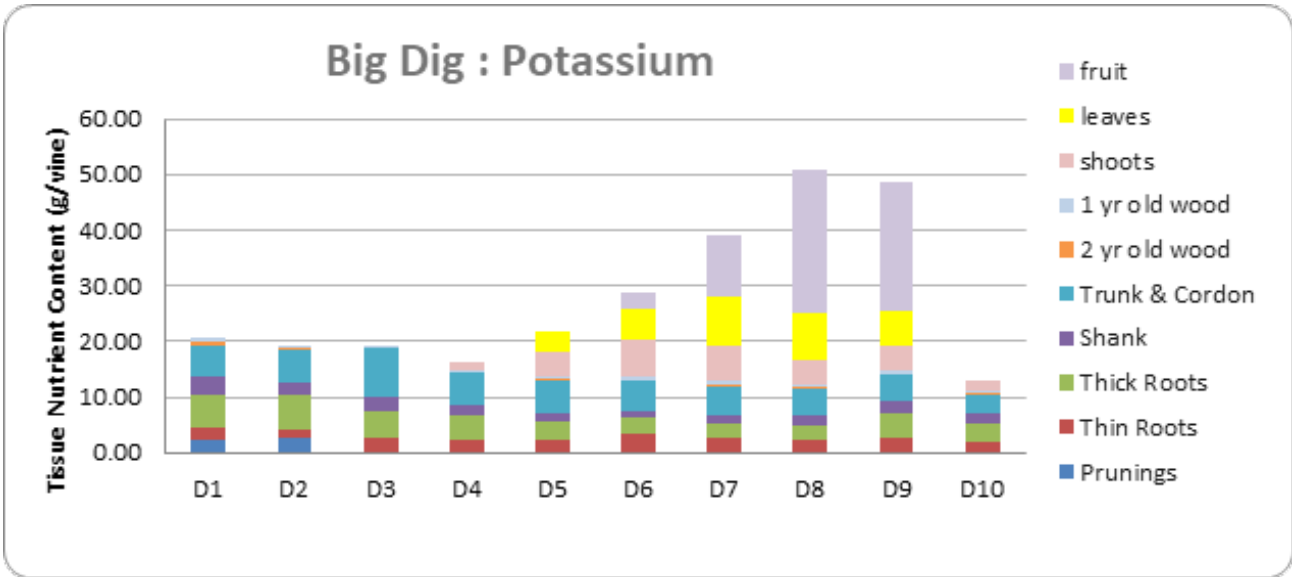

Figure *3*. Big Dig Total Potassium Content in Plant Organs per Growing Point

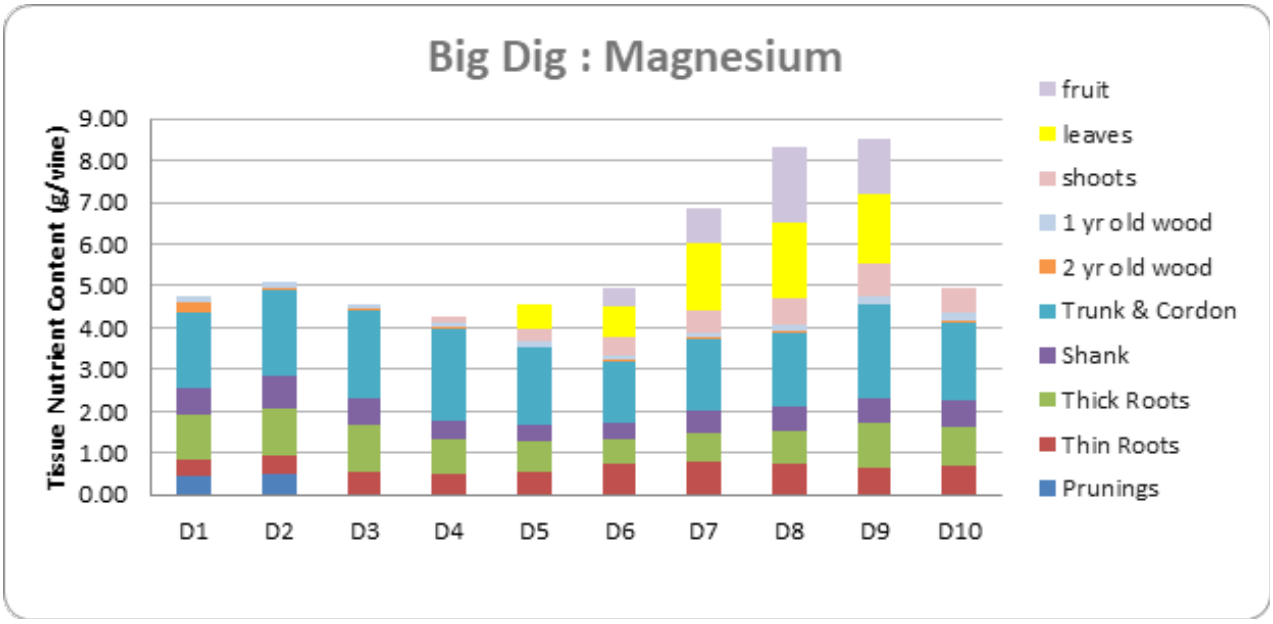

Figure *4*. Big Dig Total Magnesium Content in Plant Organs per Growing Point

The Magnesium Graph measures Mg content in the total vine ranging from 0-10 grams. Which point of the growing season has the highest Mg accumulation (look for the tallest bar)? It is D9, or harvest. What organ of the vine has the most Mg at harvest? It is the Trunk & Cordon. Even though the total content may not be close to other nutrients, they all follow a similar pattern of needing to get more from the soil before bloom.

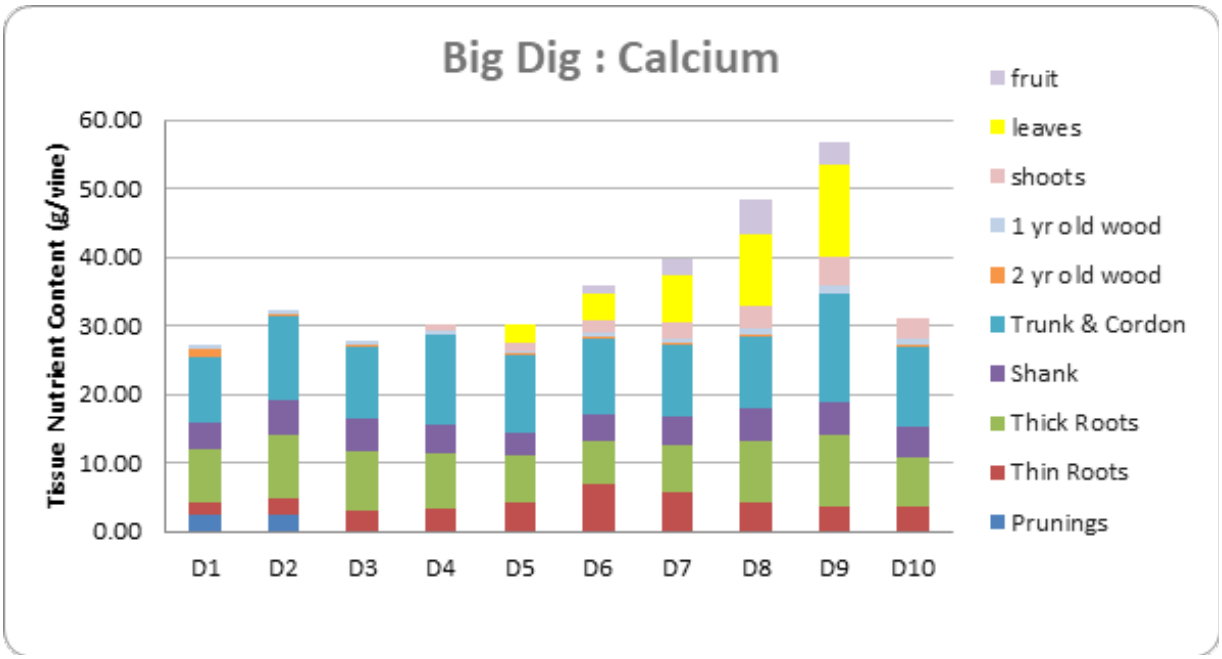

Figure *5*. Big Dig Total Calcium Content in Plant Organs per Growing Point

The last color nutrient concentration graph to look at today is Big Dig : Calcium. Note the similar pattern of nutrient acquisition as other macronutrients.

Just to recap the scientific data shared above, there are similar patterns in all of the vine's macronutrient total content to support plant growth throughout the growing season. A grape vine is going to grow without human intervention. However, in a commercial setting where we are pushing

vines to produce more, we take fertilizer recommendations into account. This is why the timing of our nutrient applications are so important for optimal vine health. If you follow the recommendation of fertilizer applications two weeks before bloom and up to four weeks after in a commercial vineyard setting, then the additional nutrients will be there for the vine.

This article discusses the timing of nutrient acquisition of macronutrients based off of the data collected from the Big Dig study (unpublished), not what is available in the soil. That is another article in itself, but we need to address that your soil pH is very important for nutrient availability. Research has shown that nutrients become available in soils used for agricultural purposes between pH of 5.5-6.5/7.0. Monitoring your soil pH for optimum nutrient availability and taking petiole samples at bloom and veraison will go a long way into your soil and vine health assessment and management. Below is a figure reference table that is a classic view of the influence of soil pH on nutrient availability for 12 different plant nutrients. This particular figure was published by Washington State Extension in Vineyard Nutrient Management in Washington State at http://pubs.cahnrs.wsu.edu/publications/wp-content/uploads/sites/2/publications/EM111E.pdf on page 5 of 45. This visual tool can help you understand at what pH level the nutrients are readily available for the plant uptake.

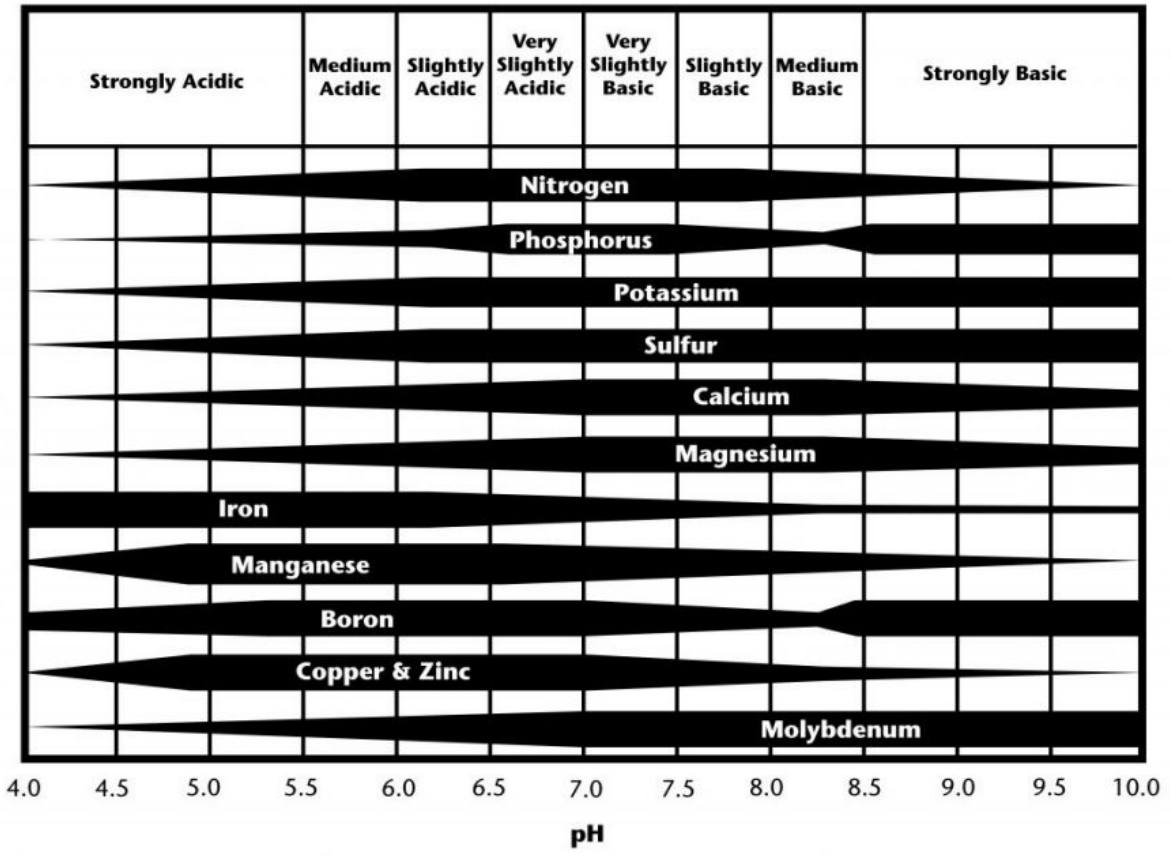

Figure 1. The influence of soil pH on nutrient availability for 12 different plant nutrients. The thicker the line, the more available the nutrient. The thinner the line, the less available the nutrient. At very acidic soils (less than 5.0) and very basic soils (greater than 9.0) many nutrients become limiting. The ideal soil pH range for grapes to optimize nutrient availability is between 6.5 and 6.8, but grapes can also grow well in soil pH between 6.0 and 8.0.

I hope that this article helped you to gain an understanding of why we recommend soil nutrient applications two weeks before bloom and up to four weeks after. Should you have any questions, please feel free to reach out via email at jjr268@cornell.edu.

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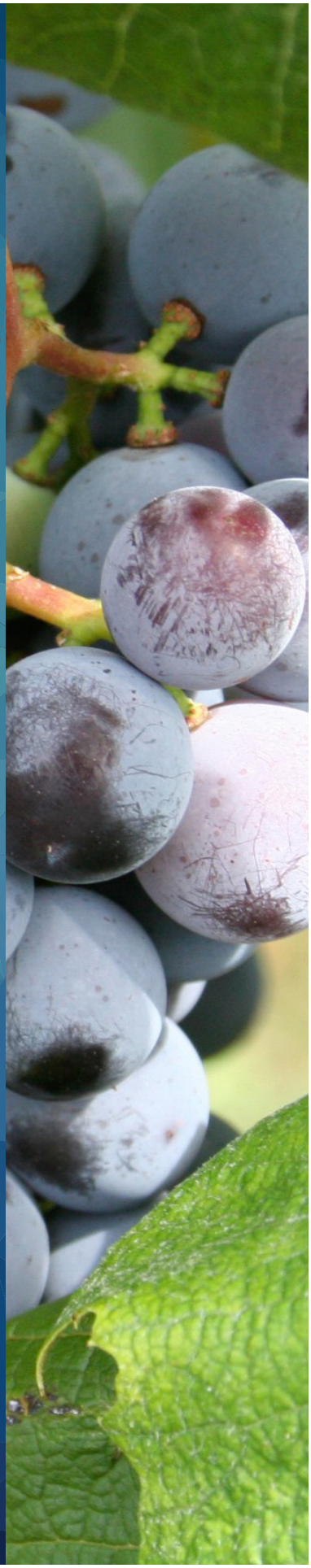
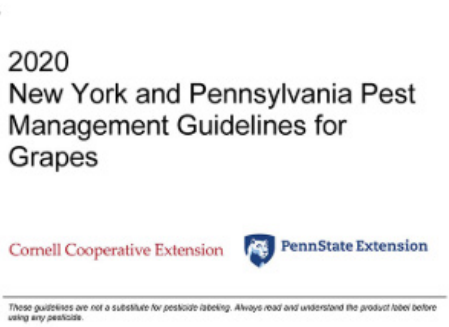


PA Update

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

2020 New York & Pennsylvania Pest Management Guidelines for Grapes – Additions/Changes/Deletions



The "New York and Pennsylvania Pest Management Guidelines for Grapes" is a continually evolving document that includes a tremendous amount of research-based information conducted over the years from dedicated faculty and staff from both states. A number of the former contributors to these Guidelines have passed away or retired but their input remains invaluable. I express my appreciation to all those (past and present) involved in the production of the "New York and Pennsylvania Pest Management Guidelines for Grapes".

FUNGICIDES:

New Fungicide

Cevya 3.3 SC (mefentrifluconazole), sterol inhibitor – Cevya is a new DMI fungicide that is currently registered for use on grapes in Pennsylvania, but not yet in New York at press time. **Note: Cevya is not registered for use on *Vitis labrusca* or *Vitis labrusca* hybrid varieties.**

Changes

Intuity 4SC (mandestrobin) – Labeled in NY for 2020 season. Restricted use pesticide in NY. Not for use in Nassau and Suffolk counties in NY. **NOTE: Do not use Intuity on *V. labrusca*, *V. labrusca* hybrids or other non-vinifera hybrids.**

Miravis Prime (pydiflumetofen + fludioxonil) – Labeled in NY for 2020 season. Restricted use pesticide in NY. Not for use in Nassau and Suffolk counties in NY.

Torino (cyflufenamid) – new additional label rate information. The new label allows for a single application at double the old rate of 3.4 fl. oz/A. It is suggested that the higher 6.8 fl. oz/A application could be useful to span an extended period when conditions are favorable for powdery mildew development, but unfavorable for maintaining a regular or tighter spray schedule. In such circumstances, the higher rate will provide longer residual control of powdery mildew. Torino has a 4-hr REI and a 3-day PHI when applying at the 3.4 fl. oz/A rate, and a 7-day PHI when using the 6.8 fl oz rate. The label restricts its use to a maximum of 6.8 fl. oz of product per calendar year (two applications at the 3.4 fl oz rate or one application at the 6.8 fl. oz rate).

Removed from 2020 Guidelines

Flint 50WG – Flint Extra replaces Flint 50WG.

Presidio - Valent has pulled the grape use from the Presidio label.

INSECTICIDES:

New Insecticides

Altus (flupyradifurone) - Restricted use in NY. Not for use in Nassau and Suffolk counties in New York. Selected uses: Leafhoppers, some other sucking insects. **NOTE**: **Altus is for nursery and landscape grapes only.**

Cyclaniliprole 50 SL– Restricted use in NY. Not for use in Nassau and Suffolk counties in New York. Selected uses: Lepidoptera, Japanese beetle, thrips, spotted-wing drosophila. Cyclaniliprole is in the diamide group (IRAC group 28) so should have high efficacy against GBM.
Verdepryn (cyclaniliprole) - Restricted use in NY. Not for use in Nassau and Suffolk counties in New York. Selected uses: Lepidoptera, Japanese beetle, thrips, spotted-wing drosophila. Verdepryn is in the diamide group (IRAC group 28) so should have high efficacy against GBM.

Drosophila fruit flies, spotted wing drosophila & Spotted Lanternfly – new information added (pages 124 -125).

Changes

Intrepid 2F (methoxyfenozide) - Intrepid has been approved for use on grapes in New York but not for use in Nassau and Suffolk counties in New York. The 24(c) Special Local Need labeling must be in the possession of the user at the time of application. Selected uses: Grape Berry Moth and other Lepidoptera.

Removed from 2020 Guidelines

Belt – Can no longer be used on any crop after 2019.

Tourismo – Contains the same active ingredient (flubendiamide) as in Belt.

HERBICIDES:

Changes

Gramoxone MAX, Gramoxone SL 2.0 (paraquat) – Note that newer paraquat labels require use only by certified applicators, that the certified applicator must complete EPA-approved paraquat training every three years, and use closed transfer systems when using smaller containers. Growers using paraquat with older, still registered labels, can use the product according to the label on those containers.

PA Update

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

Evaluation of Harvest More Urea Mate on *Vitis labrusca* 'Concord' grapes, 2017-2019.
Bryan Hed, Lake Erie Regional Grape Research and Extension Center; Penn State University

Earlier this spring, we concluded a 3-year trial to examine the effects of applications of Harvest More Urea Mate to Concord grape in the Lake Erie region. Harvest More Urea Mate is a commonly used product for Concord grape producers in the Lake Erie region, and is generally sold to growers to be used as a foliar nutrient spray. With an analysis of 5-10-27, its mostly potassium, and applications are generally made at 5-7.5 lbs/A (1.35-2 lbs actual potassium per acre, per spray). Our objectives were to examine a 5 lb/A application for effects on late summer vine nutrient status, yield, vine size (pruning weight), fruit quality (brix) and powdery mildew control.

This trial was conducted in a mature vineyard of *Vitis labrusca* 'Concord' at the Lake Erie Regional Grape Research and Extension Center in North East, PA. Vines were trained to a single-curtain, high-wire cordon system. Treatments were applied to 21-vine plots in a randomized complete block design with four replications. Each treatment row was separated by an unsprayed buffer row, and each plot was separated by a buffer panel within the row. Diseases were not controlled in buffers, likely making disease pressure higher than what would commonly be encountered in a commercial vineyard block. Treatments were applied at 50 gal/A using a Friend covered-boom plot sprayer at a pressure of 125 psi.

In this trial, Harvest More Urea Mate (HMUM) was compared to an unsprayed check, a standard rotational program (SRP) of conventional fungicides, and a tank mix combination of HMUM x SRP, for control of powdery mildew, and effects on yield (kg/vine), vine vigor (pruning weights), fruit composition (brix), and vine nutrition (leaf petiole tissue analysis). Treatments were generally applied in three pre-bloom sprays followed by two post-bloom sprays, where applications were made every 10-14 days. Spray treatments targeted the following grapevine phenological stages: 3-6" shoots, 8-12" shoots, immediately pre-bloom, immediately post-bloom, and 2nd post-bloom. HMUM was applied at 5 lbs/A. The SRP for powdery mildew control consisted of Tebustar (4 oz/A) at 8-12" shoots, Quintec (4 fl oz/A) at immediately pre-bloom, Vivando (10.3 fl oz/A) at immediately post-bloom, followed by a second Tebustar application at 2nd post-bloom. Other diseases (Phomopsis, downy mildew, and black rot) were controlled in the SRP with Manzate Prostick (3 lbs/A) pre-bloom and Ziram (4 lbs/A) post-bloom.

On fruit, powdery mildew incidence (percent clusters diseased) and severity (percent area of clusters diseased) were determined on 3 July (2017), 23-25 July (2018), and 20 August (2019) from 50 clusters selected randomly from the center 15 vines in each plot, and from both sides of the trellis. On leaves, powdery mildew incidence and severity were determined on 19 July, 17 August, and 21 September (2017), 10 August, and 3 and 24 September (2018), and 29 August and 18 September (2019) on 50 leaves selected randomly from the center 15 vines per plot, and from both sides of the trellis. Yield measurement in balanced pruned vines was conducted on September 21 (2018) and October 4 (2019). Commercial harvest of the entire block occurred 20-21 October (2017), September 29 to October 1 (2018) and 8-12 October (2019). Vines were balanced pruned in late winter/early spring of 2018 and 2019. Data were subjected to analysis of variance (ANOVA) using the general linear model function in Minitab 18 (2017 and 2018) and Minitab 19 (2019), followed by mean separation with Fisher's LSD at $P \leq 0.05$.

Effects of treatments on powdery mildew: In 2017, Total rainfall for May, Jun, Jul, Aug, and Sep was 5.70, 3.62, 0.84, 2.35, and 2.7 in., respectively. In 2018, total rainfall for May, Jun, Jul, Aug, and Sep was 4.67, 3.74, 2.14, 4.02, and 5.01 in., respectively. In 2019, Total rainfall for May, Jun, Jul, Aug, and Sep was 2.74, 4.58, 2.9, 4.04, and 2.04 in., respectively. Throughout the trial, there was very little Phomopsis, black rot, or downy mildew development within the trial block. Powdery mildew development was considered modest in 2017 and 2019 and moderately high in 2018. Treatments that included the SRP provided significant control of powdery mildew incidence and severity on fruit in every year, when compared to the check (table 1). HMUM alone provided significant control in only one year (2018) and only with respect to fruit disease severity. However, the addition of HMUM to SRP significantly lowered fruit disease incidence over SRP alone, in two of the three years (2018 and 2019).

Table 1. Powdery Mildew on Concord fruit

	Incidence				Severity[z]			
treatment	2017	2018	2019	% control[y]	2017	2018	2019	% control[y]
HMUM	81.5 a[x]	96.5 ab[x]	77.0 a[x]	4	2.40 a[x]	**5.26 b**[x]	3.25 ab[x]	27
SRP	**27.0 b**	**92.0 b**	**65.0 b**	**32**	**0.63 b**	**4.53 bc**	**2.49 b**	**55**
SRP x HMUM	**16.0 b**	**84.5 c**	**53.5 c**	**43**	**0.39 b**	**3.48 c**	**2.03 b**	**65**
Check	88.0 a	99.0 a	79.5 a		3.09 a	7.77 a	4.40 a	

[z]Severity was rated using the Barratt-Horsfall scale and was converted to % area infected (0-100 %) using Elanco conversion tables.
[y]Percent control = control of disease severity over that of the unsprayed check, averaged over 3 years.
[x]Means followed by the same letter within columns are not significantly different according to Fisher's LSD ($P \leq 0.05$).

The results on leaves were similar to those on fruit (table 2); SRP and SRP x HMUM generally provided the best control, achieving significant (and equivalent) disease reductions at nearly all assessments, when compared to HMUM and the check. On the other hand, HMUM alone, controlled leaf disease in only about a quarter of the assessments. Nevertheless, HMUM, when added to SRP, did improve powdery mildew control over SRP alone, which was illustrated for leaf incidence at September 21 in 2017 and for leaf severity at September 3 in 2018. In 2018, significant control of leaf disease severity was maintained by all treatments up to September 3, but as in 2017, only treatments with the SRP controlled disease severity, as we approached the end of September. In 2019, leaf disease pressure was relatively low in comparison to the previous two years, and yet, significant reductions were only achieved with SRP and SRP + HMUM (incidence) at the initial assessment on August 29. Figures 1-4 illustrate Concord grapevine canopies typical of the treatments at harvest.

Table 2. Powdery mildew on Concord leaves

	Incidence			Severity[z]		
2017	Jul 19	Aug 17	Sep 21	Jul 19	Aug 17	Sep 21
HMUM	32.5 a[y]	92.5 a[y]	100.0 a[y]	1.14 a[y]	**12.12 b**[y]	24.87 ab[y]
SRP	**3.0 b**	**81.5 b**	99.0 a	**0.07 b**	**4.75 c**	**14.70 bc**
SRP x HMUM	**3.0 b**	**80.5 b**	**90.0 b**	**0.07 b**	**5.25 c**	**11.00 c**
Check	36.0 a	96.5 a	99.5 a	1.18 a	19.00 a	31.60 a
2018	Aug 10	Sep 3	Sep 24	Aug 10	Sep 3	Sep 24
HMUM	**52.0 b**[y]	99.0 a[y]	100.0	**2.65 b**[y]	**27.96 b**[y]	44.29 a[y]
SRP	**5.5 c**	96.5 ab	100.0	**0.24 b**	**18.17 c**	**36.68 b**
SRP x HMUM	**7.0 c**	**87.0 b**	99.5	**0.18 b**	**8.21 d**	**29.44 b**
Check	87.0 a	100.0 a	100.0	10.56 a	38.99 a	49.09 a
2019		Aug 29	Sep 18		Aug 29	Sep 18
HMUM		87.0 a[y]	90.0		11.55	16.46
SRP		**76.0 b**	91.5		5.86	16.09
SRP x HMUM		**71.5 b**	90.5		6.89	12.62
Check		89.0 a	91.0		10.63	15.69

[z]Severity was rated using the Barratt-Horsfall scale and was converted to % area infected (0-100 %) using Elanco conversion tables.
[y]Means followed by the same letter within columns are not significantly different according to Fisher's LSD ($P \leq 0.05$).

Figure 1. Concord grapevines; Unsprayed check vines at harvest 2019

Figure 2. Concord grapevines treated with HMUM; harvest 2019

Figure 3. Concord grapevines treated with SRP; harvest 2019

Figure 4. Concord grapevines treated with SRP x HMUM; harvest 2019

Effects on pruning weight (vine vigor), cluster weight and number, brix, and yield from balanced vines (Table 3): In early spring of 2018, six adjacent vines in each plot were balanced pruned using a formula of 20 plus 20, per the recommendation of Dr. Terry Bates at Cornell University. According to this formula, 20 buds were left for the first pound of cane prunings, and 20 more buds were left for each additional pound of cane prunings. Vines for balanced pruning were selected for uniformity to provide data on vine vigor, yield, and fruit quality over the next 2-3 years. Initially, vine size ranged from 1.7 to 2.1 pounds (medium to small sized vines) with bud numbers ranging from about 34 to 42 buds per vine. There were no significant differences in vine size among any of the four treatments at the initial pruning in the spring of 2018 (an intended result of striving to select vines of the "same" size in each treatment, at the beginning of the experiment). Vine size (and hence, bud number) increased in all treatments from year one to year two, and in all but the check from year 2 to year 3. The largest increase in pruning weight occurred among vines treated with the standard rotational program (SRP), where vines more than doubled in size (by 112%) over 3 years. The smallest increase in pruning weight occurred among check vines, where vines increased by only about 52% (less than half the increase of the SRP). However, within each year, there was never a treatment effect on vine size.

At harvest, fruit was hand harvested and weighed from each of the six balanced vines in each plot (24 vines per treatment) in the fall of 2018 and 2019. Number of clusters per plot was recorded and cluster weight and yield per vine determined. Fruit samples from each plot (24 whole clusters per plot (the primary and secondary cluster from each of two randomly selected shoots (one shoot from the north and one from the south side of the trellis) per balanced vine)), were weighed and ground up in a commercial blender to be used for brix determination. Data are presented for each treatment in table 3 below.

There were few significant treatment effects on any of these parameters, with the exception of cluster weight and yield in 2018; cluster weight was significantly higher in treatments that included the SRP, when compared to HMUM and the check (which were not different from each other). The heavier cluster size further translated into a yield difference where HMUM was significantly lower than that of all other treatments, including the check (where this effect could be attributed to the combination of slightly heavier clusters *and* greater cluster numbers in the check vines). Another significant effect worth noting is the higher brix recorded for the HMUM treatment, when compared to the SRP (alone) in 2019. This is thought to relate to the large difference in yield between these two treatments, enabling the smaller crop to reach higher maturity levels by harvest.

Table 3. Treatment effects on Concord pruning weight, bud number, brix, and cluster weight, number and yield per vine at harvest.

2018	Pruning wt	Bud number	Cluster weight (g)	Brix	Cluster number/ vine	Kg per vine
HMUM	1.9	37.8	91.2	16.9	74.7	6.79
SRP	1.71	34.2	94.5	16.15	81	7.66
HMUM x SRP	1.82	36.4	96.5	16.7	79.3	7.64
CHECK	2.11	41.4	88.2	16.55	80.2	7.08
2019	Pruning wt	Bud number	Cluster weight (g)	Brix	Cluster number/ vine	Kg per vine
HMUM	3.16	63	84.6 b*	17.55 a*	128.6	**10.83 b***
SRP	3.02	60.5	**101.85 a**	16.78 b	127.3	12.88 a
SRP x HMUM	3.06	61	**100.4 a**	16.83 ab	122.3	12.28 a
Check	3.39	67.4	88.8 b	16.88 ab	136.8	12.15 a
2020	Pruning wt	Bud number	% Increase over 2018			
HMUM	3.42	68.4	80			
SRP	3.62	72.4	112			
SRP x HMUM	3.20	64	76			
Check	3.21	64.2	52			

*Means followed by the same letter within columns are not significantly different according to Fisher's LSD ($P \leq 0.05$).

Treatment effects on vine nutrient status: In September, petiole samples were collected from each plot for treatment effects on tissue nutrient analysis. Sixty petioles were collected for each treatment (15 per plot) each year and submitted to the Ag Analytical Services Laboratory at the main Penn State University campus in State College PA, for standard ICP analysis. The results are presented in table 4.

Table 4: Early September petiole analysis.

Recommended ranges:	**0.14-0.3**	**1.5-2.5**	**1.2-2.0**	**0.35-0.5**		**50-1000**	**30-100**	**10-50**	**25-50**		**30-60**
2017	P %	K %	Ca %	Mg %	S %	Mn mg/kg	Fe mg/kg	Cu mg/kg	B mg/kg	Al mg/kg	Zn mg/kg
HMUM	0.17	0.83	2.19	0.45	0.14	451	37	8	33	11	31
SRP	0.17	0.67	2.35	0.53	0.16	414	39	9	30	9	62
SRP x HMUM	0.18	0.87	2.24	0.47	0.16	505	35	9	32	11	59
CHECK	0.15	1.08	2.22	0.41	0.16	391	48	10	29	16	30
2018	P %	K %	Ca %	Mg %	S %	Mn mg/kg	Fe mg/kg	Cu mg/kg	B mg/kg	Al mg/kg	Zn mg/kg
HMUM	0.21	2.14	1.59	0.34	0.11	410	68	10	35	39	55
SRP	0.23	1.50	1.77	0.47	0.10	488	78	9	32	47	90
SRP x HMUM	0.26	1.82	1.80	0.45	0.11	474	64	9	37	33	103
CHECK	0.25	2.35	1.81	0.42	0.13	406	76	11	35	43	55
2019	P %	K %	Ca %	Mg %	S %	Mn mg/kg	Fe mg/kg	Cu mg/kg	B mg/kg	Al mg/kg	Zn mg/kg
HMUM	0.21	1.63	1.38	0.35	0.11	218	35	10	43	12	40
SRP	0.21	1.22	1.50	0.38	0.12	288	30	11	39	9	42
SRP x HMUM	0.25	1.53	1.31	0.38	0.12	253	30	10	39	10	*55*
CHECK	0.21	1.34	1.45	0.36	0.12	264	27	11	37	8	37

The petiole samples were collected and analyzed as a composite sample (petioles from each plot of a treatment were combined into a single sample for each treatment) and therefore were not statistically analyzed. Over three years, there were very few anomalies in tissue nutrient levels and all treatments were within acceptable range for most elements (Table 4). Red font indicates a deficiency and blue, an excess. All treatments were deficient in potassium in 2017, possibly due to the big crop in that year (?). However, it's worth noting that in 2019 (another year with a large crop), only treatments that did not contain HMUM (SRP and Check) were deficient in potassium, suggesting that HMUM was enabling vines to achieve better nutrient balance with respect to potassium. Copper levels were generally at the low end of the acceptable range (10-50 mg/kg) in all treatments in most years. There were some differences in Zn levels when we compare treatments with the SRP to those without. This is most logically explained by the pre-bloom applications of a mancozeb based fungicide (which contains zinc) used in the SRP treatments, that likely contributed to higher amounts of zinc in petiole tissue tests. However, treatments without mancozeb (HMUM and CHECK) have zinc levels well within the acceptable level (30-60 mg/kg).

Conclusions from three years of Concord trials: These results suggest that HMUM, as a stand-alone treatment, can provide modest suppression of powdery mildew on Concord fruit and leaves, particularly in early to mid-summer. However, HMUM may be best used to enhance a Standard Rotational Program of conventional fungicides for more commercially acceptable levels of powdery mildew control on Concord grape. It may also improve potassium levels in leaves, particularly in seasons where cropping is heavy. The highest soluble solids levels were recorded for the HMUM treatment, but this could be attributed to the lower yields generally pulled from those plots in both 2018 and 2019. Overall, HMUM did not contribute to an increase in vine size or yield.

Hand Sanitizer and Face Masks Available to Farmers

Kimberly Knappenberger, Viticulture Aide, LERGP

Cornell Cooperative Extension Chautauqua County is distributing free hand sanitizer and face masks to producers in Chautauqua County. Sanitizer and face coverings from the NYS Department of Agriculture have been brought to Chautauqua County through a partnership with CCE Chautauqua and Chautauqua County department of Building and grounds.

Production farms of any type are welcome to come pick up supplies. These farms can include dairy, livestock, grapes, vegetables, farm stands, U-Pick, nursery, equine, and craft beverage. **To sign up for your free product please go to** chautauqua.cce.cornell.edu/resources/hand-sanitizer-and-face-maks-request.

Supplies can then be picked up at CLEREL; 6592 West Main Road; Portland, NY on Mondays from 11:00 AM until 2:30 PM until supplies are exhausted.

For those of you who have already picked up gallon jugs of hand sanitizer with the hand pump, I'm sure you have noticed how fast and how much comes out. A simple trick that some have tried is to put a piece of a pool noodle or pipe insulator on the pump to keep it from pressing all the way. This will reduce the amount of sanitizer dispensed.

*We may have small spray bottles for the next distribution on Monday, but are currently out of them at the lab.

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