FINGER LAKES GRAPE PROGRAM

RESEARCH·RELATIONSHIPS·RELEVANCE

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FINGER LAKES VINEYARD UPDATE

July 2025 - Issue, [010]

Photo Credit: Chris Kitchen (UREL)

Cornell Cooperative Extension
Finger Lakes Grape Program

IN THE VINEYARD

I will be away on vacation and then attending the GiESCO viticulture conference in Geisenheim, Germany over the next few weeks, so there will be no Vineyard Update newsletters until I return the week of August 4. There will also be no Tailgate Meeting on July 22. - Hans

Based on my observations the past couple of weeks, fruit set seems to have gone well for the most part thanks in no small part to the change in the weather a few weeks ago from cold and wet to hot and dry. Over the past four weeks, Geneva has received only 1.3" of rain (other stations have recorded a bit more or a bit less than that). Berries are beginning to size up, anywhere from BB to almost pea size depending on location and variety. This means there is a higher potential for tight clusters and splitting berries later in the year, unless conditions remain dry until veraison and berry size is diminished due to water stress.

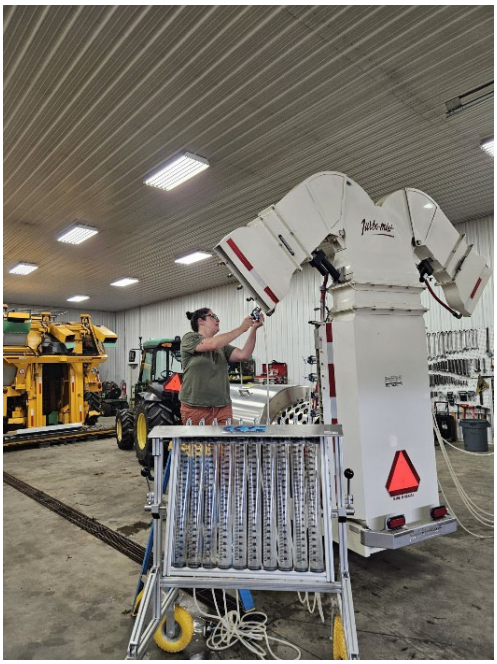
The amount of active downy infections seems to have also dropped thanks to the drier weather as well. While there are still some out there, it's harder to find those fluffy white patches on the undersides of leaves than it was a few weeks ago. Fortunately, we're getting to the point where fruit is developing immunity to new infections by powdery, downy and black rot, which alleviates some of the pressure on the vines, and growers. Of course, green tissues including leaves, stems, rachises, etc. continue to be vulnerable to infection, even after the berries no longer are.

Disease	**Berry resistance develops…**
Powdery mildew	2-3 weeks after fruit set
Downy mildew	3-4 weeks after bloom
Black rot	5-8 weeks after bloom

Sprayer Best Practices and Calibration Update
Megan Luke, Viticulture & Tree Fruit Educator – Penn State University

This article originally appeared in the July 3, 2025 edition of the Lake Erie Regional Grape Program's Crop Update newsletter.

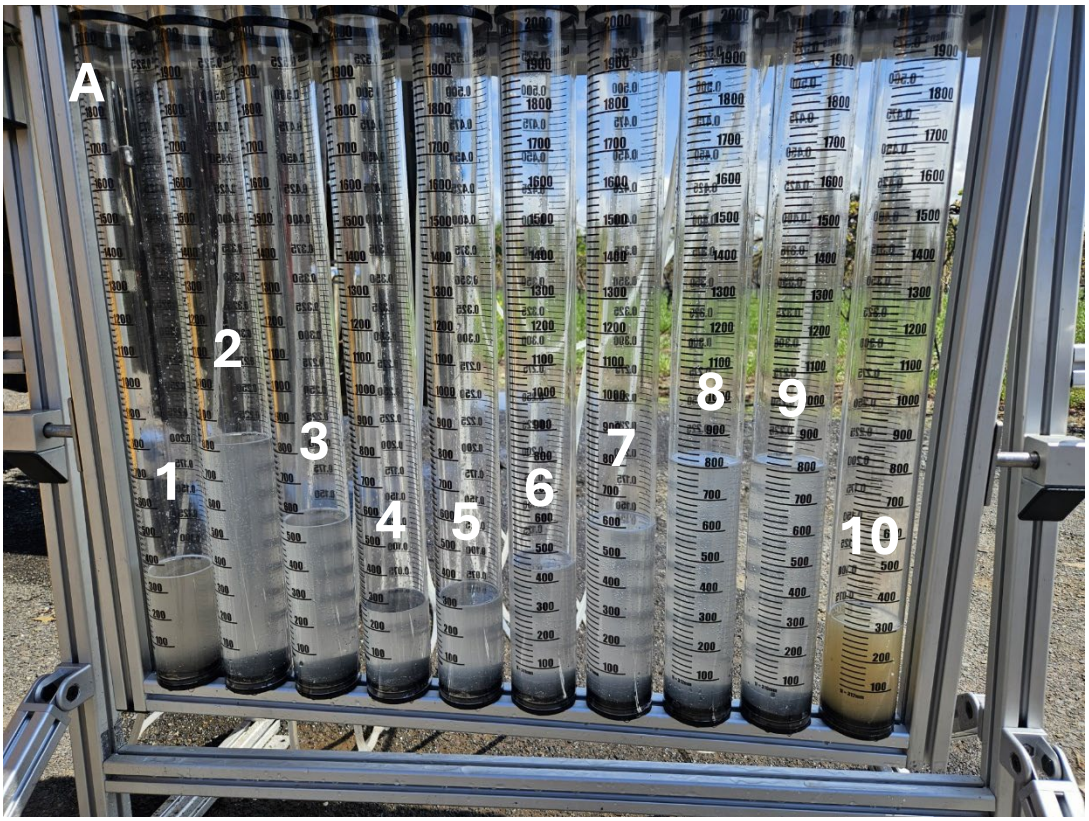
Calibrations of spray equipment have been in full swing, and I have some availability for mid-season appointments if you have noticed issues in your spray program. Please contact me for availability or schedule through the LERGP website.



A few observations as I have had the opportunity to work on various sprayers throughout the grape belt and beyond:

- Having a flow meter or being accurate in "field calibration" does not mean that you have good coverage
- All sprayers, but especially multi-row sprayers, are sensitive to pressure. Issues in a single nozzle can result in incorrect output in multiple nozzles
- Water quality issues can contribute to BOTH material failures and coverage issues
- Every calibration appointment I have completed has resulted in at least one issue being uncovered, meaning everyone has room to improve!

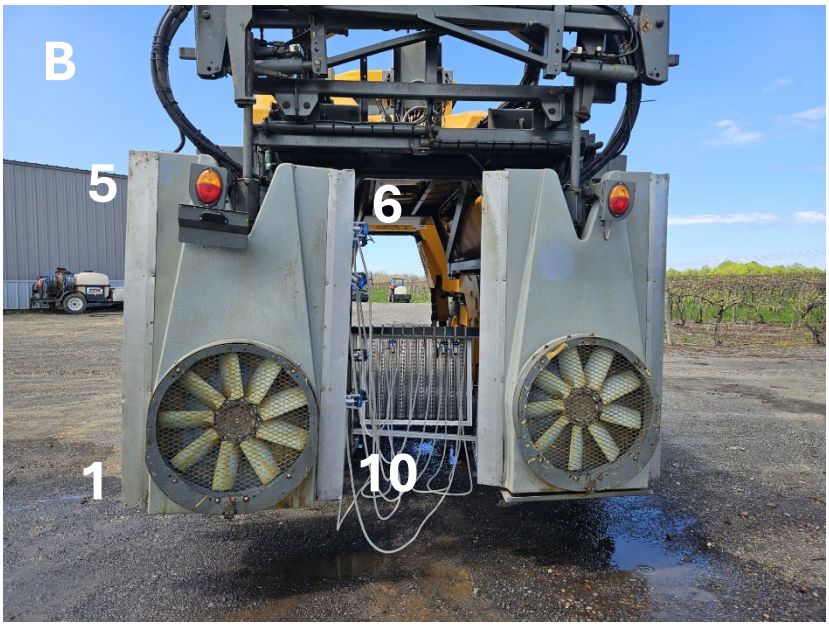
Before calibration:



In this photo (A), nozzles 1 through 5 are connected to one side of the panel on a multi-row sprayer, and nozzles 6 through 10 are connected to the other side. These sets of nozzles would be spraying opposite directions. Nozzle 1 and nozzle 10 are the bottom most nozzles on the panel, nozzles 5 and 6 are the top most nozzles.

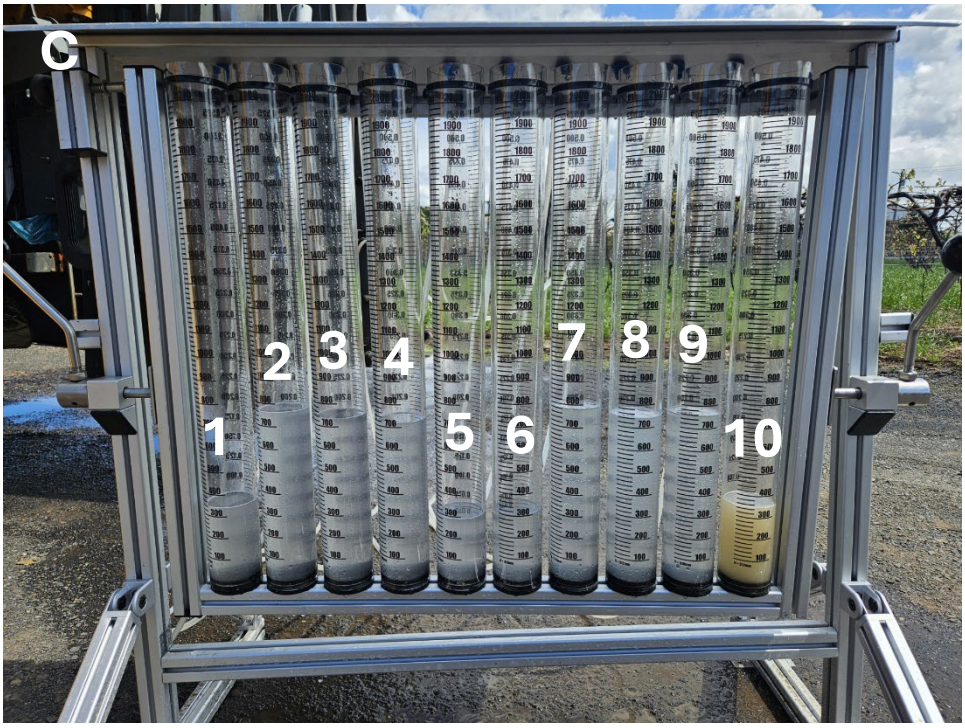
In photo A, nozzles 1, 5, 6, and 10 should be passing the same amount of fluid. Nozzles 2,3,4,7,8, and 9 should also be passing the same amount as each other, higher than the top and bottom nozzles.

Sprayer during calibration:



The lowest nozzles on the panels, 1 and 10, passed liquid that was dark and contaminated. Due to the way that material settles within the panels, it is a good idea to remove the lowest nozzles when not in use so the system discharges any material. Be sure to flush out the machine frequently. It was also observed that the only blockages that were found with nozzle removal were in nozzles 4 and 7. After those nozzles were cleaned, the system regulated and no further adjustments were needed.

Post calibration:



In photo C you can see that the nozzles are in alignment with the expected output based on nozzle orifice size and whirl plate. Sediment is still present in the lowest nozzles, but running water through the system should flush out any remnants.

Takeaways:

- The flow meter for the system was accurate in terms of output, but the nozzles were not within calibration specifications, which is within 5% of expected output based on manufacturer specs and system pressure.

- The issues observed were enough to lead to poor coverage and therefore material failures.

- The level of blockage observed was enough to put the sprayer out of calibration, BUT NOT BAD ENOUGH TO BE OBSERVABLE FROM THE CAB.

- The issue of small bits of debris blocking nozzles may continue and should be regularly checked. To avoid this issue- install a simple sediment filter in your water system pre-mixing tank. Keep filters within the sprayer clean and change them as required by the manufacturer. Check nozzles for clogs and blockages often.

- Without a full calibration, these issues would have been nearly impossible to detect visually or with the whole system flow meter. When in doubt, calibrate!

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Potential Effects of the Proposed 50 % U.S. Tariff on Imported Copper on Copper-Based Fungicides

Katie Gold, PhD
Cornell AgriTech Grape Pathology & Extension
Prepared with assistance from Generative AI

What just happened — and what hasn't (yet)

On July 8, 2025 President Trump announced his intent to levy a 50 % tariff on all imported refined copper under Section 232. Commerce Secretary Lutnick said the duty *could* take effect **as early as August 1, 2025**, but details are still being negotiated in Congress and with key trading partners. **The dialogue is dynamic—final rates, exemptions, or delays remain possible.** U.S. COMEX copper futures immediately jumped **≈ 12–13 % to a record ≈ $5.64/lb** (intraday high). Chile, Canada, and Mexico—currently the top three suppliers of refined copper to the U.S.—would all be covered unless country-specific carve outs are agreed on.

How might this affect New York grapevine production?

Below are the **primary copper products currently labeled for use on grapes in New York** (OMRI listing noted for organic programs). **Conventional programs** typically use copper sparingly, however **organic production** rely more heavily on copper, especially for downy mildew. These growers typically make at least **3–6 sprays per season** at **0.25–1 lb metallic Cu/acre** depending on cultivar and disease pressure. Some growers use low dose copper products in every tank up to 16 times a season. NY-labeled products restrict growers to **≤ 6 lb metallic Cu/acre per year** (check product labels). Staying well below this cap reduces phytotoxicity risk and helps comply with DEC scrutiny of cumulative copper loading.

Product (common package size)	**Active ingredient**	**% metallic Cu (approx.)**	**OMRI?**	**Typical NY retail price ***	**Cu cost share at $5 lb-^{1}**
Kocide 3000-O (10 lb)	Copper hydroxide	30%	✓	$120 / 10 lb	≈ 12 %
Cueva® (2.5 gal)	Copper octanoate	1.8%	✓	$108 / 2.5 gal	< 2 %
Champ WG (20 lb)	Copper hydroxide	50%	✓	$185 / 20 lb	≈ 14 %
Nu-Cop 50 WP (25 lb)	Copper oxychloride	50%	✗	$170 / 25 lb	≈ 15 %

Badge SC (2.5 gal)	Copper hydroxide + oxychloride	24%	✓	$155 / 2.5 gal	≈ 7 %
Cuprofix® Ultra 40 DF (12.5 lb)	Basic copper sulfate	40%	✓	$105 / 12.5 lb	≈ 10 %
Mastercop® (1 gal)	Copper sulfate pentahydrate (ion)	5%	✓	$39 / gal	≈ 4 %
Copper-Count-N® (2.5 gal)	Copper ammonium complex	8%	✗	$85 / 2.5 gal	≈ 7 %
Cuproxat® FL (2.5 gal)	Copper sulfate basic	8.2%	✗	$93 / 2.5 gal	≈ 7 %

* Representative on-line/retail quotes, July 2025. Prices vary by volume and distributor.

How might a 50% tariff impact copper fungicide prices?

1. **Copper cost component** – the tariff would add **≈ $2.50–3.00 lb-[1]** to current $5.6–5.8 metal prices if fully passed through.
2. **Formulation share** – For high-load products like Champ WG, Kocide 3000, or Nu-Cop 50 WP, copper accounts for **10–15 % of shelf price**; doubling copper cost could lift retail prices **≈ 5–10 %**. Low-load liquids (e.g. Cueva, Mastercop) may rise only **< 3 %**.
3. **Timing** – Distributors typically hold 3- to 6-month inventories. If tariffs are enacted on the proposed timeline, expect higher list prices on **late-season 2025 or 2026** stock; brief spot shortages are possible if importers delay purchases ahead of tariff implementation.

Management guidance for NY vineyard managers

Immediate (next 30 days)	**2025–26 budget season**	**Longer-term strategy**
Talk with suppliers now to confirm on-hand volumes and any price	Build a **5–15 % cushion** into 2026 budgets for high-load	Continue reducing reliance on copper. Consider experimenting with

protection through harvest.	powders/granules; liquids may need only 3 %.	biofungicides with broad spectrum action (e.g., LifeGard, Warhammer, HowlerEVO, etc).
For **organic acreage**, consider **forward-booking** fall deliveries before Aug 1.	If cash flow allows, **pre-buy** a portion of 2026 needs during summer sales.	Track per-acre copper totals—tariff pressure is an added incentive to optimize rates and canopy coverage.

Key take-aways

- The proposed tariff targets the **metal**, not finished formulations, but higher copper feedstock costs will ripple through.
- High-load products (Kocide, Champ, Nu-Cop, Cuprofix, Badge) could rise **5–10 %**; low-load liquids (Cueva, Mastercop) likely **< 3 %**.
- Policy is **not final**—rates, scope, or timing could still change. Stay informed and consider early procurement.

Implications for NY Policymakers & Ag Influencers

- *Economic footprint*. New York's grape industry spans ~35,000 bearing acres and supports over $6 billion in annual wine, juice, and tourism revenue. Input-cost shocks of even $20–40 acre-[1] on copper sprays could erase $0.7–1.4 million in grower margins statewide—money otherwise reinvested in labor, equipment, and sustainability upgrades.
- *Organic & small farms hit hardest*. Nearly 9 % of NY vineyard acreage is certified organic or low-input IPM *(USDA NASS 2024 New York Vineyard Practices Survey)*. These growers rely on copper as a cornerstone fungicide; higher prices (or shortages) leave them few affordable alternatives.
- *Supply-chain and trade retaliation vulnerability*. Tariff uncertainty may prompt distributors to pare inventory. Major copper exporters (Chile, Canada, Mexico) are also key markets for NY wines and ag products. Policymakers should monitor for retaliatory duties that could compound grower exposure.

BEWARE OF AI PEST MANAGEMENT RECOMMENDATION

Lynn Sosnoskie, Weed Scientist - Cornell AgriTech

Anyone who has heard me speak knows that I see great promise in the integration of artificial intelligence (AI) with advanced weed control technologies like laser weeding and vision-guided spraying. These tools offer the precision needed to reduce herbicide use while maintaining effective weed suppression. AI-driven platforms can distinguish between crops and weeds in real time, enabling site-specific management that minimizes crop injury potential and environmental impact. I'm particularly excited about using these technologies to address herbicide-resistant weeds and other difficult-to-control species through novel means.

But AI has its drawbacks. The information it provides is not always accurate. For example, my initial experiences with the Carbon Robotics Laser Weeder and the Verdant Robotics Sharp Shooter in New York were marked by poor control of common ragweed, a species not commonly found in the western US. and therefore not represented in the machines' training algorithms. In another instance, I asked ChatGPT to generate a description of Palmer amaranth, and the output incorrectly stated that the species has wind-dispersed seed. Palmer amaranth seed lacks a pappus, the umbrella- or parachute-like structure found on dandelions that enable long-distance transport on wind currents. This highlights the importance of reviewing AI-generated content for accuracy.

A recent article by Dr. Eric Prostko (University of Georgia) in Farm Progress highlights the risks of relying on AI recommendations for pest management, using real-world examples where such advice could have caused problems for the producers. https://www.farmprogress.com/crop-protection/extension-specialist-beware-of-ai-herbicide-recommendations Specifically, AI tools suggested the use of herbicides that are not legally registered for use on the target crops, leading to regulatory violations as well as the potential for severe crop injury (for example, an atrazine recommendation in peanuts). While AI tools may seem convenient, they lack the local agronomic knowledge and judgment that trained professionals bring to pest management decisions. Cornell Cooperative Extension has an extensive network of specialists deployed across the state to assist growers with their weed control needs. They are here to help you, so please take advantage of their experience when it comes to developing pest management plans. And, as always, CONSULT THE LABEL before making any pesticide applications. The label provides critical information for safe and effective use. Applying a pesticide in a manner inconsistent with its labeling can result in crop injury, environmental harm, and potential health risks to applicators or bystanders.

SOIL HEALTH SURVEY SAMPLING IN FINGER LAKES VINEYARDS

We are working with Cornell's Soil Health Program once again this year to increase the number of soil health samples collected from vineyards. We have funding to collect samples from up to 10 vineyards in 2025 (1 sample per vineyard right now). We will also be collecting leaf tissue samples to see what kinds of relationships there might be between the soil health indicators that the tests measure and the nutrient content of the vines. The results from both of these tests will be shared with each grower as we get them. The only request we have from participating growers is to answer some questions about production history and floor management practices in the tested blocks. We will send this questionnaire/survey out shortly after harvest is finished.

If you're not familiar with exactly what Cornell's soil health test measures, I have included a sample report in this week's newsletter. A soil health test looks at a number of chemical parameters like pH and content of various nutrients (N, P, K, etc.), similar to a standard soil test, but it also measures some physical and biological properties that are associated with healthier soils, such as aggregate stability, organic matter content, and soil respiration, which is an indicator of microbial activity in the soil. In addition to the results themselves (first page), there is an extensive explanation of each of the parameters that are measured and why they are important for soil health. The final section of the report includes some short-term and long-term things that can be done to address deficiencies in any of the measures included in the report. Growers who want to improve any particular factor in the report can use this information to decide on possible practices to undertake to improve those factors.

One of the reasons that we are focusing on this work is that many aspects regarding soil health in agriculture are based on annual cropping systems, which involve significantly more tillage and periods of time where soil is bare and exposed to potential issues such as runoff. In perennial systems, especially in the East, some of our standard practices are the same as those often recommended to improve soil health in annual systems, such as maintaining cover crops and reducing tillage. What, then, are important soil health factors that growers should be paying attention to, and that are worth investing time and resources in, to benefit the vineyard? My interest in this work is to gain an understanding of just how particular soil health practices can help to improve the health of the vines or the performance of the vineyard in terms of yield, fruit quality, etc.

Samples will be collected in mid to late August. Growers who had samples collected from their vineyards last year can request another test this year in a different vineyard block, but we will prioritize growers who have not had samples collected from their vineyards for this project.
If you would like to have us collect samples from your vineyard this summer, please contact Brittany (bg393@cornell.edu or 315-536-5134) and she will put you on the list.

Comprehensive Assessment of Soil Health

From the Cornell Soil Health Laboratory, Department of Soil and Crop Sciences
School of Integrative Plant Science, Cornell University, Ithaca, NY 14853
https://soilhealthlab.cals.cornell.edu

Agricultural Service Provider:
Debbie Aller
da352@cornell.edu

Sample ID: [redacted]
Field ID: V24.ARD.NI
Date Sampled: 08/14/2024
Crops Grown: GVP / GVP / GVP
Tillage: 1-7 inches
Coordinates: [redacted]

Measured Soil Textural Class: **loam**

Sand: **42%** - Silt: **38%** - Clay: **20%**

Group	Indicator	Value	Rating	Constraints
physical	Predicted Available Water Capacity	**0.2**	**71**	
physical	Surface Hardness	**230**	**22**	
physical	Subsurface Hardness	**308**	**47**	
physical	Aggregate Stability	**27.3**	**42**	
biological	Organic Matter Soil Organic Carbon: 1.37 / Total Carbon: 1.38 / Total Nitrogen: 0.14	**2.5**	**30**	
biological	Predicted Soil Protein	**4.63**	**29**	
biological	Soil Respiration	**0.4**	**24**	
biological	Active Carbon	**512**	**53**	
chemical	Soil pH	**6.9**	**100**	
chemical	Extractable Phosphorus	**1.6**	**47**	
chemical	Extractable Potassium	**250.1**	**100**	
chemical	Additional Nutrients Ca: 1131.3 / Mg: 159.9 / S: 3.9 Al: 3.3 / B: 0.26 / Cu: 0.17 Fe: 0.3 / Mn: 3.4 / Zn: 0.6		**100**	

Overall Quality Score: **55** / Medium

Measured Soil Health Indicators

The Cornell Soil Health Test measures several indicators of soil physical, biological and chemical health. These are listed on the left side of the report summary, on the first page. The "value" column shows each result as a value, measured in the laboratory or in the field, in units of measure as described in the indicator summaries below. The "rating" column interprets that measured value on a scale of 0 to 100, where higher scores are better. Ratings in red are particularly important to take note of, but any in yellow, particularly those that are close to a rating of 30 are also important in addressing soil health problems.

- **A rating below 20 indicates *Very Low (constraining)* functioning and is color coded red.** This indicates a problem that is likely limiting yields, crop quality, and long term sustainability of the agroecosystem. In several cases this indicates risks of environmental loss as well. The "constraint" column provides a short list of soil processes that are not functioning optimally when an indicator rating is red. It is particularly important to take advantage of any opportunities to improve management that will address these constraints.
- **A rating between 20 and 40 indicates *Low* functioning and is color coded orange.** This indicates that a soil process is functioning somewhat poorly and addressing this should be considered in the field management plan. The Management Suggestions Table at the end of the Soil Health Assessment Report provides linkages to field management practices that are useful in addressing each soil indicator process.
- **A rating between 40 and 60 indicates *Medium* functioning and is color coded yellow.** This indicates that soil health could be better, and yield and sustainability could decrease over time if this is not addressed. This is especially so if the condition is being caused, or not being alleviated, by current management. Pay attention particularly to those indicators rated in yellow and close to 40.
- **A rating between 60 and 80 indicates *High* functioning and is color coded light green.** This indicates that this soil process is functioning at a non-limiting level. Field soil management approaches should be maintained at the current intensity or improved.
- **A rating of 80 or greater indicates *Very High* functioning and is color coded dark green.** Past management has been effective at maintaining soil health. It can be useful to note which particular aspects of management have likely maintained soil health, so that such management can be continued. Note that soil health is often high, when first converting from a permanent sod or forest. In these situations, intensive management quickly damages soil health when it includes intensive tillage, low organic matter inputs, bare soils for significant parts of the year, or excessive traffic, especially during wet times.
- **The Overall Quality Score** at the bottom of the report is an average of all ratings, and provides an indication of the soil's overall health status. However, the important part is to know which particular soil processes are constrained or suboptimal so that these issues can be addressed through appropriate management. Therefore the ratings for each indicator

are more important information.

The Indicators measured in the Cornell Soil Health Assessment are important soil properties and characteristics in themselves, but also are representative of key soil processes, necessary for the proper functioning of the soil. The following is a summary of the indicators measured, what each of these indicates about your soil's health status, and what may influence the relevant properties and processes described.

A Management Suggestions Table follows, at the end of the report, with short and long term suggestions for addressing constraints or maintaining a well functioning system. This table will indicate constraints identified in this assessment for your soil sample by the same yellow and red color coding described above. Please also find further useful information by following the links to relevant publications and web resources that follow this section.

Texture is an inherent property of soil, meaning that it is rarely changed by management. It is thus not a soil health indicator per se, but is helpful both in interpreting the measured values of indicators (see the Cornell Soil Health Assessment Training Manual), and for deciding on appropriate management strategies that will work for that soil.

Your soil's measured textural class and composition: loam

Sand: 42% - Silt: 38% - Clay: 20%

Predicted Available Water Capacity (AWC) is not a directly measured soil property but is modeled from a suite of measured soil health indicators including the percent sand, silt, clay and organic matter. By using a decision tree approach, the developed Random Forest model can predict the laboratory measured AWC value with no more error than that encountered in the raw laboratory analysis. Details of this modeling effort can be found in our Soil Health Management Series Fact Sheet Number 19-05b.

https://cpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/f/5772/files/2016/12/05b_Soil_Health_Fact_Sheet_Available_Water_Capacity-Predicted-2019-002-132f3th.pdf

The Soil Health Lab continues to offer the laboratory measured AWC test as an add-on to the soil health package analyses.

The Predicted AWC value is presented as grams of water per gram of soil. This value is scored against an observed distribution in regional soils with similar texture. A physical soil characteristic, AWC is an indicator of the amount of plant-available water the soil can store, and therefore how crops will fare in droughty conditions. Soils with lower storage capacity will cause greater risk of drought stress. AWC is generally lower when total organic matter and/or aggregation is low. It can be improved by reducing tillage, long-term cover cropping, and adding large amounts of well-decomposed organic matter such as compost. Coarse textured (sandy) soils inherently store less

water than finer textured soils, so that managing for relatively high water storage capacity is particularly important in coarse textured soils. While the textural effect cannot be influenced by management, management decisions can be in part based on an understanding of inherent soil characteristics.

> **Your Predicted Available Water Capacity value** is **0.2 g/g**, corresponding with a score of **71**. This score is in the **High** range, relative to soils with similar texture. **This suggests that this soil process is enhancing overall soil resilience. Soil management should aim at maintaining this functionality while addressing any other measured soil constraints as identified in the Soil Health Assessment Report.** Please refer to the management suggestions table at the end of this document.

Surface Hardness is a measure of compaction that develops when large pores are lost in the surface soil (0 6 inches). Compaction is measured in the field using a penetrometer, and the resultant value is expressed in pounds per square inch (p.s.i.), representing the localized pressure necessary to break forward through soil. It is scored by comparison with a distribution observed in regional soils, with lower hardness values rating higher scores. A strongly physical characteristic of soils, surface hardness is an indicator of both physical and biological health of the soil, as growing roots and fungal hyphae must be able to grow through soil, and may be severely restricted by excessively hard soil. Compaction also influences water movement through soil. When surface soils are compacted, runoff, erosion, and slow infiltration can result. Soil compaction is influenced by management, particularly in timing and degree of traffic and plowing disturbance, being worst when the soil is worked wet.

> **Your measured Surface Hardness value** is **230 p.s.i.**, corresponding with a score of **22**. This score is in the **Low** range, relative to soils with similar texture. **This suggests that, while Surface Hardness does not currently register as a strong constraint, management practices should be geared toward improving this condition, as it currently indicates suboptimal functioning.** Please refer to the management suggestions table at the end of this document.

Subsurface Hardness is a measure of compaction that develops when large pores are lost in the subsurface soil (6 18 inches). Subsurface hardness is measured and scored similarly to surface hardness, but deeper in the profile, and scored against an observed distribution in regional soils with similar texture. Large pores are necessary for water and air movement and to allow roots to explorethe soil. Subsurface hardness prevents deep rooting and thus deep water and nutrient uptake by plants, and can increase disease pressure by stressing plants. It also causes poor drainage and poor deep water storage. After heavy rain events, water can build up over a hard pan causing poor aeration both at depth and at the surface, as well as ponding, poor infiltration, runoff and erosion. Impaired water movement and storage create greater risk during heavy rainfall events, as well as greater risk of drought stress. Compaction occurs very rapidly when the

soil is worked or trafficked while it is too wet, and compaction can be transferred deep into the soil even from surface pressure. Subsoil compaction in the form of a plow pan is usually found beneath the plow layer, and is caused by smearing and pressure exerted on the undisturbed soil just beneath the deepest tillage operation, especially when wet.

> **Your measured Subsurface Hardness value** is **308 p.s.i.**, corresponding with a score of **47**. This score is in the **Medium** range, relative to soils with similar texture. **This suggests that, while Subsurface Hardness is functioning at an average level, management practices should be geared toward improving this condition, as it currently indicates suboptimal functioning. Soil management should aim at improving this functionality while addressing any other measured soil constraints as identified in the Soil Health Assessment Report.** Please refer to the management suggestions table at the end of this document.

Aggregate Stability is a measure of how well soil aggregates or crumbs hold together under rainfall or other rapid wetting stresses. Measured by the fraction of dried aggregates that disintegrate under a controlled, simulated rainfall event similar in energy delivery to a hard spring rain, the value is presented as a percent, and scored against a distribution observed in regional soils with similar textural characteristics. A physical characteristic of soil, Aggregate Stability is a good indicator of soil biological and physical health. Good aggregate stability helps prevent crusting, runoff, and erosion, and facilitates aeration, infiltration, and water storage, along with improving seed germination and root and microbial health. Aggregate stability is influenced by microbial activity, as aggregates are largely held together by microbial colonies and exudates, and is impacted by management practices, particularly tillage, cover cropping, and fresh organic matter additions.

> **Your measured Aggregate Stability value** is **27.3 %**, corresponding with a score of **42**. This score is in the **Medium** range, relative to soils with similar texture. **This suggests that, while Aggregate Stability is functioning at an average level, management practices should be geared toward improving this condition, as it currently indicates suboptimal functioning. Soil management should aim at improving this functionality while addressing any other measured soil constraints as identified in the Soil Health Assessment Report.** Please refer to the management suggestions table at the end of this document.

Organic Matter (OM) is a measure of the carbonaceous material in the soil that is biomass or biomass derived. Measured by the mass lost on combustion of oven dried soil, the value is presented as a percent of the total soil mass. This is scored against an observed distribution of OM in regional soils with similar texture. A soil characteristic that measures a physical substance of biological origin, OM is a key or central indicator of the physical, biological, and chemical health of the soil. OM content is an important influence on soil aggregate stabilization, water retention, nutrient cycling, and ion exchange capacity. Soils with low organic matter tend to require higher

inputs, and be less resilient to drought and extreme rainfall. The retention and accumulation of OM is influenced by management practices such as tillage and cover cropping, as well as by microbial community growth. Intensive tillage and lack of organic matter biomass additions from various sources (amendments, residues, active crop or cover crop growth) will decrease organic matter content and overall soil health with time.

Total Carbon (Tot C) is an indicator for the OM in soil, with carbon comprising 48-58% of the total weight of OM. The Tot C analysis measures all of the carbon in a sample using complete oxidation of carbon to CO2 using high temperature combustion (1100C). The measured Tot C includes ***organic*** forms of carbon (Soil Organic Carbon SOC), comprised of available carbon as well as relatively inert carbon in stable organic materials. Carbon can also be found in ***inorganic*** form (Soil Inorganic Carbon SIC) as carbonate minerals such as calcium carbonate (lime).

Soil Organic Carbon (SOC) is equivalent to Tot C when there are no carbonate minerals. However, soils above pH 6.5 may contain high levels of carbonates. These carbonates are measured as SIC and subtracted from the Tot C: **SOC = Tot C - SIC**.

Total Nitrogen (Tot N) includes the organic (living and non-living) and inorganic (or mineral) forms of nitrogen. About half of the Tot N found in soil is in relatively stable organic compounds. Inorganic nitrogen is liberated from organic nitrogen sources in the soil, particularly proteins and amino acids through the action of soil microorganisms. Ammonium (NH4+) and nitrate (NO3-) are the inorganic forms of nitrogen found in soil that are plant available. The Tot N is determined following the combustion methodology known as DUMAS.

> **Your measured Organic Matter value** is **2.5 %**, corresponding with a score of **30**. This score is in the **Low** range, relative to soils with similar texture. **This suggests that, while Organic Matter does not currently register as a strong constraint, management practices should be geared toward improving this condition, as it currently indicates suboptimal functioning.** Please refer to the management suggestions table at the end of this document. The **SOC** level is **1.37%**, the **Tot C** level is **1.38%**, the **Tot N** level is **0.14%**.

Predicted Soil Protein is not a directly measured soil property but is modeled from a suite of measured soil health indicators including the percent sand, silt, clay and organic matter. By using a decision tree approach, the developed Random Forest model can predict the laboratory measured soil protein value with a tolerable small error. Details of this modeling effort can be found in our Soil Health Management Series Fact Sheet 20-09b. https://cpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/f/5772/files/2020/05/09b-Predicted-Protein.pdf

The Soil Health Lab continues to offer the laboratory measured Soil Protein test as an add-on to the Standard soil health package analyses.

The Predicted Soil Protein is presented as mg per gram of soil. This indicator represents the fraction of the soil organic matter that is present as protein or protein-like substances. Protein

content, as organically bound N, influences the ability of the soil to make N available by mineralization, and has been associated with soil aggregation and water movement. Protein content can be influenced by biomass additions, the presence of roots and soil microbes, and tends to decrease with increasing soil disturbance such as tillage.

> **Your measured Predicted Soil Protein value** is **4.63** , corresponding with a score of **29**. This score is in the **Low** range, relative to soils with similar texture. **This suggests that, while Predicted Soil Protein does not currently register as a strong constraint, management practices should be geared toward improving this condition, as it currently indicates suboptimal functioning.** Please refer to the management suggestions table at the end of this document.

Soil Respiration is a measure of the metabolic activity of the soil microbial community. Measured by capturing and quantifying carbon dioxide (CO 2) produced by this activity, the value is expressed as total CO 2 released (in mg) per gram of soil over a 4 day incubation period. Respiration is scored against an observed distribution in regional soils, taking texture into account. A direct biological activity measurement, respiration is an indicator of the biological status of the soil community, integrating abundance and activity of microbial life. Soil biological activity accomplishes numerous important functions, such as cycling of nutrients into and out of soil OM pools, transformations of N between its several forms, and decomposition of incorporated residues. Soil biological activity influences key physical characteristics like OM accumulation, and aggregate formation and stabilization. Microbial activity is influenced by management practices such as tillage, cover cropping, manure or green manure incorporation, and biocide (pesticide, fungicide, herbicide) use.

> **Your measured Soil Respiration value** is **0.4 mg**, corresponding with a score of **24** . This score is in the **Low** range, relative to soils with similar texture. **This suggests that, while Soil Respiration does not currently register as a strong constraint, management practices should be geared toward improving this condition, as it currently indicates suboptimal functioning.** Please refer to the management suggestions table at the end of this document.

Active Carbon is a measure of the small portion of the organic matter that can serve as an easily available food source for soil microbes, thus helping maintain a healthy soil food web. Measured by potassium permanganate oxidation, the value is presented in parts per million (ppm), and scored against an observed distribution in regional soils with similar texture. While a measure of a class of physical substances, active carbon is a good leading indicator of biological soil health and tends to respond to changes in management earlier than total organic matter content, because when a large population of soil microbes is fed plentifully with enough organic matter over an extended period of time, well decomposed organic matter builds up. A healthy and diverse microbial community is essential to maintain disease resistance, nutrient cycling, aggregation, and many other important functions. Intensive tillage and lack of organic matter additions from

various sources (amendments, residues, active crop or cover crop growth) will decrease active carbon, and thus will over the longer term decrease total organic matter.

> **Your measured Active Carbon value** is **512 ppm**, corresponding with a score of **53**. This score is in the **Medium** range, relative to soils with similar texture. **This suggests that, while Active Carbon is functioning at an average level, management practices should be geared toward improving this condition, as it currently indicates suboptimal functioning. Soil management should aim at improving this functionality while addressing any other measured soil constraints as identified in the Soil Health Assessment Report.** Please refer to the management suggestions table at the end of this document.

Soil pH is a measure of how acidic the soil is, which controls how available nutrients are to crops. A physico chemical characteristic of soils, pH is an indicator of the chemical or nutrient status of the soil. Measured with an electrode in a 1:1 soil:water suspension, the value is presented in standard pH units, and scored using an optimality curve. Optimum pH is around 6.2 6.8 for most crops (exceptions include potatoes and blueberries, which grow best in more acidic soil – this is not accounted for in the report interpretation). If pH is too high, nutrients such as phosphorus, iron, manganese, copper and boron become unavailable to the crop. If pH is too low, calcium, magnesium, phosphorus, potassium and molybdenum become unavailable. Lack of nutrient availability will limit crop yields and quality. Aluminum toxicity can also be a concern in low pH soils, which can severely decrease root growth and yield, and in some cases lead to accumulation of aluminum and other metals in crop tissue. In general, as soil OM increases, crops can tolerate lower soil pH. Soil pH also influences the ability of certain pathogens to thrive, and of beneficial organisms to effectively colonize roots. Raising the pH through lime or wood ash applications, and organic matter additions, will help immobilize aluminum andheavy metals, and maintain proper nutrient availability.

> **Your measured Soil pH value** is **6.9** , corresponding with a score of **100**. This score is in the **Very High** range, relative to soils with similar texture. **This suggests that management practices should be geared toward maintaining this condition, as it currently indicates ideal soil functioning.** Please refer to the management suggestions table at the end of this document.

Extractable Phosphorus is a measure of phosphorus (P) availability to a crop. Measured on a modified Morgan's extract using an ICP Spectrometer, the value is presented in parts per million (ppm), and scored against an optimality curve for sufficiency or excess. P is an essential plant macronutrient, and its availability varies with soil pH and mineral composition. Low P values indicate poor P availability to plants, and excessively high P values indicates a risk of adverse environmental impact through runoff and contamination of surface waters. Most soils in the Northeast store unavailable P from the soil's mineral make up or from previously applied fertilizer or manure. This becomes more available to plants as soils warm up. Therefore, incorporating or

banding 10 25 lbs/acre of soluble 'starter' P fertilizer at planting can be useful even when soil levels are optimum. Some cover crops, such as buckwheat, are good at mining otherwise unavailable P so that it becomes more available to the following crop. When plants associate with mycorrhizal fungi, these can also help make P (and other nutrients and water) more available to the crop. P is an environmental contaminant and runoff of P into fresh surface water will cause damage through eutrophication, so over application is strongly discouraged, especially close to surface water, on slopes, and on large scales.

> **Your measured Extractable Phosphorus value** is **1.6 ppm**, corresponding with a score of **47**. This score is in the **Medium** range, relative to soils with similar texture. **This suggests that, while Extractable Phosphorus is functioning at an average level, management practices should be geared toward improving this condition, as it currently indicates suboptimal functioning. Soil management should aim at improving this functionality while addressing any other measured soil constraints as identified in the Soil Health Assessment Report.** Please refer to the management suggestions table at the end of this document.

Extractable Potassium is a measure of potassium (K) availability to the crop. Measured on a modified Morgan's extract using an ICP Spectrometer, the value is presented in parts per million (ppm), and scored against an optimality curve for sufficiency. K is an indicator of soil nutrient status, as it is an essential plant macronutrient. Plants with higher potassium tend to be more tolerant of frost and cold. Thus good potassium levels may help with season extension. While soil pH only marginally affects K availability, K is easily leached from sandy soils and is only weakly held by increased organic matter, so that applications of the amount removed by the specific crop being grown are generally necessary in such soils.

> **Your measured Extractable Potassium value** is **250.1 ppm**, corresponding with a score of **100**. This score is in the **Very High** range, relative to soils with similar texture. **This suggests that management practices should be geared toward maintaining this condition, as it currently indicates ideal soil functioning.** Please refer to the management suggestions table at the end of this document.

Additional Nutrients including (calcium (Ca), magnesium (Mg) and sulfur (S)) with micronutrients (aluminum (Al), boron (B), copper (Cu), iron (Fe), manganese (Mn) and zinc (Zn), etc.) are essential plant nutrients taken up by plants in smaller quantities than the macronutrients N, P and K. Note that some leafy vegetables can require significant amounts of these nutrients. If any of these nutrients are deficient, this will decrease yield and crop quality, but toxicities can also occur when concentrations are too high. While Al is not technically a plant nutrient, it can become toxic to crop plants at pH below 5.5. The solubility and availability of all of the elements are strongly influenced by pH and organic matter. High pH favors the availability of magnesium and calcium whereas low pH increases the availability of most micronutrients. High OM and microbial activity tend to increase micronutrient availability. The ratings indicate whether these measured nutrients

are deficient or excessive.

> **Your measured Additional Nutrients Rating** is **100**. This score is in the **Very High** range. Magnesium (159.9 ppm) is sufficient, Iron (0.3 ppm) is sufficient, Manganese (3.4 ppm) is sufficient, Zinc (0.6 ppm) is sufficient, Aluminum (3.3 ppm) is sufficient, Calcium (1131.3 ppm) is sufficient, Copper (0.17 ppm) is sufficient, Sulfur (3.9 ppm) is sufficient, Boron (0.26 ppm) is sufficient. **This suggests that management practices should be geared toward maintaining this condition, as it currently indicates ideal soil functioning.** Please refer to the management suggestions table at the end of this document.

Overall Quality Score: an overall quality score is computed from the individual indicator scores. This score is further rated as follows: less than 20% is regarded as very low, 20-40% is low, 40-60% is medium, 60-80% is high, and greater than 80% is very high. The highest possible quality score is 100 and the least score is 0, thus it is a relative overall soil health status indicator. However, of greater importance than a single overall metric is identification of constrained or suboptimally functioning soil processes, so that these issues can be addressed through appropriate management. The overall soil quality score should be taken as a general summary rather than the main focus.

> **Your Overall Quality Score** is **55**, which is in the **Medium** range.

Management Suggestions for Physical and Biological Constraints

Constraint	Short Term Management Suggestions	Long Term Management Suggestions
Predicted Available Water Capacity Low	• Add stable organic materials, mulch • Add compost or biochar • Incorporate high biomass cover crop	• Reduce tillage • Rotate with sod crops • Incorporate high biomass cover crop
Surface Hardness High	• Perform some mechanical soil loosening (strip till, aerators, broadfork, spader) • Use shallow-rooted cover crops • Use a living mulch or interseed cover crop	• Shallow-rooted cover/rotation crops • Avoid traffic on wet soils, monitor • Avoid excessive traffic/tillage/loads • Use controlled traffic patterns/lanes
Subsurface Hardness High	• Use targeted deep tillage (subsoiler, yeomans plow, chisel plow, spader.) • Plant deep rooted cover crops/radish	• Avoid plows/disks that create pans • Avoid heavy loads • Reduce traffic when subsoil is wet
Aggregate Stability Low	• Incorporate fresh organic materials • Use shallow-rooted cover/rotation crops • Add manure, green manure, mulch	• Reduce tillage • Use a surface mulch • Rotate with sod crops and mycorrhizal hosts
Organic Matter Low	• Add stable organic materials, mulch • Add compost and biochar • Incorporate high biomass cover crop	• Reduce tillage/mechanical cultivation • Rotate with sod crop • Incorporate high biomass cover crop
Predicted Soil Protein Low	• Add N-rich organic matter (low C:N source like manure, high N well-finished compost) • Incorporate young, green, cover crop biomass • Plant legumes and grass-legume mixtures • Inoculate legume seed with Rhizobia & check for nodulation	• Reduce tillage • Rotate with forage legume sod crop • Cover crop and add fresh manure • Keep pH at 6.2-6.5 (helps N fixation) • Monitor C:N ratio of inputs

Constraint	Short Term Management Suggestions	Long Term Management Suggestions
Soil Respiration Low	• Maintain plant cover throughout season • Add fresh organic materials • Add manure, green manure • Consider reducing biocide usage	• Reduce tillage/mechanical cultivation • Increase rotational diversity • Maintain plant cover throughout season • Cover crop with symbiotic host plants
Active Carbon Low	• Add fresh organic materials • Use shallow-rooted cover/rotation crops • Add manure, green manure, mulch	• Reduce tillage/mechanical cultivation • Rotate with sod crop • Cover crop whenever possible

Management Suggestions for Chemical Constraints

Constraint	Short Term Management Suggestions	Long Term Management Suggestions
Soil pH Low	• Add lime or wood ash per soil test recommendations • Add calcium sulfate (gypsum) in addition to lime if aluminum is high • Use less ammonium or urea	• Test soil annually & add "maintenance" lime per soil test recommendations to keep pH in range • Raise organic matter to improve buffering capacity
Soil pH High	• Stop adding lime or wood ash • Add elemental sulfur per soil test recommendations	• Test soil annually • Use higher % ammonium or urea
Extractable Phosphorus Low	• Add P amendments per soil test recommendations • Use cover crops to recycle fixed P • Adjust pH to 6.2-6.5 to free up fixed P	• Promote mycorrhizal populations • Maintain a pH of 6.2-6.5 • Use cover crops to recycle fixed P
Extractable Phosphorus High	• Stop adding manure and compost • Choose low or no-P fertilizer blend • Apply only 20 lbs/ac starter P if needed • Apply P at or below crop removal rates	• Use cover crops that accumulate P and export to low P fields or offsite • Consider low P rations for livestock • Consider phytase for non-ruminants
Extractable Potassium Low	• Add wood ash, fertilizer, manure, or compost per soil test recommendations • Use cover crops to recycle K • Choose a high K fertilizer blend	• Use cover crops to recycle K • Add "maintenance" K per soil recommendations each year to keep K consistently available
Additional Nutrients Low	• Add chelated micronutrients per soil test recommendations • Use cover crops to recycle micronutrients • Do not exceed pH 6.5 for most crops	• Promote mycorrhizal populations • Improve organic matter • Decrease soil P (binds micronutrients) • Add lime (Ca and Mg), gypsum (S), rock powder
Additional Nutrients High	• Raise pH to 6.2-6.5 (for all high micro-nutrients and Aluminum) • Do not use fertilizers with micronutrients	• Maintain a pH of 6.2-6.5 • Monitor irrigation/improve drainage • Avoid compost additions with high micronutrient levels

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Developed in partnership with Cornell Soil Health, Farmier, and GreenStart.
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UPCOMING EVENTS

Don't forget to check out the calendar on our website (https://blogs.cornell.edu/flxgrapes/events/) for more information about these and other events relevant to the Finger Lakes grape industry.

Tailgate Meeting
Tuesday, August 5, 2025 4:30 – 6:00 PM
Anthony Road Wine Company
1020 Anthony Rd., Penn Yan NY 14527

Our next Tailgate Meeting will be on Tuesday, July 8th at Boom Point Vineyards, 7483 Salmon Creek Rd., Williamson NY 14589. These meetings are a time for growers and the FLGP staff to discuss what's going on in the vineyards, ask questions, and learn from each other. There is no set agenda for the most part, so bring questions, observations, thoughts, etc. and let's talk about them. Bring a chair if you want to. Each meeting has been approved for 1.5 pesticide recertification credits by DEC.

Here is the remaining schedule for Tailgate Meetings this year:

- August 19 - 680 Cellars, 3050 Swick Rd., Ovid NY 14521

Ryan Young (UREL)

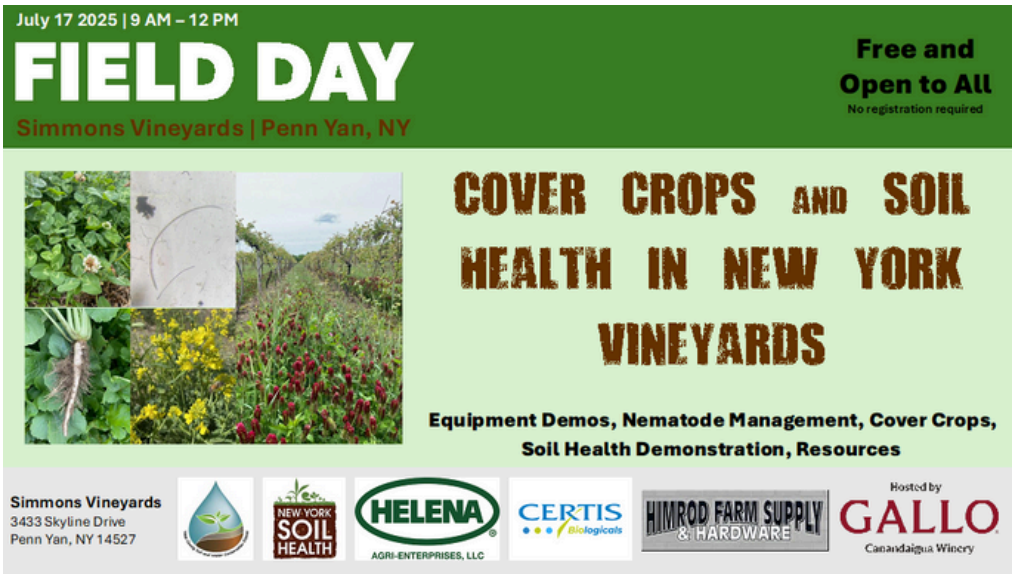
Cover Crops and Soil Health in New York Vineyards
Thursday, July 17, 2025 9:00 AM – 12:00 PM
Simmons Vineyards
3433 Skyline Drive, Penn Yan, NY

The field staff from Gallo are organizing a field meeting focused on soil health in vineyards. The meeting is being held in collaboration with Yates County Soil and Water Conservation District, New York Soil Health, Helena Agri-Enterprises, Certis Biologicals and Himrod Farm Supply. There will be in-field discussions and briefs, equipment displays and soil health trailer demonstrations.

This meeting is open to all growers, not just those who have contracts with Gallo, and there is no need to register ahead of time.

UPCOMING EVENTS

Don't forget to check out the calendar on our website (https://blogs.cornell.edu/flxgrapes/events/) for more information about these and other events relevant to the Finger Lakes grape industry.



Ryan Young (UREL)

Equipment Rodeo 2025
Wednesday, August 13 11:00 AM – 4:00 PM
Wagner Vineyards
9322 Route 414, Lodi NY

Sponsored by the NY State Wine Grape Growers, the Equipment Rodeo is the largest vineyard equipment show on the East Coast. The event will feature equipment from more than 20 dealers, including numerous harvesters and sprayers. Mark your calendars now!

2025 GDD & Precipitation

FLX Teaching & Demonstration Vineyard – Dresden, NY					
Date	Hi Temp (F)	Lo Temp (F)	Rain (inches)	Daily GDDs	Total GDDs
7/3/25	78.4	64.8	0.31	21.6	1049.7
7/4/25	75.7	59.0	0.00	17.4	1067.1
7/5/25	89.1	58.6	0.00	23.9	1090.9
7/6/25	92.8	74.1	0.00	33.5	1124.4
7/7/25	93.2	71.4	1.06	32.3	1156.7
7/8/25	75.2	66.9	0.00	21.1	1177.7
7/9/25	80.8	65.8	0.00	23.3	1201.0
Weekly Total			**1.37"**	**172.9**	
Season Total			**15.68"**	**1201.0**	

GDDs as of July 9, 2024: 1333.3

Rainfall as of July 9, 2024: 12.34"

Seasonal Comparisons (at Geneva)

Growing Degree Days

	2025 GDD [1]	Long-term Avg GDD [2]	Cumulative days ahead (+)/behind (-) [3]
April	86.3	63.9	+5
May	216.9	257.2	-2
June	585.7	486.3	+5
July	225.7	648.5	+6
August		596.7	
September		362.5	
October		114.3	
TOTAL	1114.6	2529.4	

1 Accumulated GDDs for each month.
2 The long-term average (1973-2024) GDD accumulation for that month.
3 Numbers at the end of each month represent where this year's GDD accumulation stands relative to the long-term average. The most recent number represents the current status.

2025 GDD & Precipitation

Precipitation

	2025 Rain [4]	Long-term Avg Rain [5]	Monthly deviation from avg [6]
April	2.81"	2.86"	-0.05"
May	5.23"	3.04"	2.19"
June	1.75"	3.58"	-1.83"
July	0.43"	3.48"	
August		3.19"	
September		3.43"	
October		3.39"	
TOTAL	10.22"	22.97"	

4 Monthly rainfall totals up to current date
5 Long-term average rainfall for the month (total)
6 Monthly deviation from average (calculated at the end of the month)

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Finger Lakes Grape Program

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