

Boldly, cultivating.

Since its creation in 1985, NYWGF has sponsored a research program in close coordination with the industry and academia. The Foundation's Board Research Committee oversees the solicitation of research proposals based on industry generated priority themes. Proposals are then reviewed, and subsequent recommendations are made to the full board to determine final allocations to individual projects.

For the 2023–24 fiscal year, the Foundation is investing \$584,406 in various research projects. Find out more about this year's funded projects below.

2023-2024 NYWGF Research Projects Awarded

Topic: Determining Bud Mortality Via Thermal Imaging to Guide Pruning Practices (Year 4)

Researcher: Justine Vanden Heuvel, Cornell University

Project Cost: \$22,040

Project Summary: The overarching goal of this project is to develop a system using inexpensive thermal imaging to allow grape growers to easily quantify the number of live and/or dead buds in a vineyard block to better guide pruning practices. We have developed a portable active thermography (PAT) system to differentiate live vs. dead primary buds so that growers can quickly and easily assess bud death on sampled canes. For Year 4 of the project, we will extend the use of the PAT system to grape growers in the Finger Lakes and Western NY, working closely with at least ten growers to test and troubleshoot implementation of the system and use of the data in their management decisions.

Topic: Novel Methods to Reduce Late Season Cluster Rot in Vinifera Vineyards

Researcher: Alice Wise, Cornell Cooperative Extension of Suffolk County

Project Cost: \$9,586

Project Summary: This project will evaluate the effectiveness of Parka® and Oxidate® 5.0 at reducing Botrytis bunch rot and sour rot in grapes. Treatments will include Parka® and Oxidate®, alone and in combination. The goal is to reduce incidence and severity of cluster rot but also to reduce or eliminate the need for conventional fruit fly insecticides and botrycides. Results will be communicated to the industry via newsletter articles, annual reports, and presentations at winter meetings.

Topic: Evaluation of Hybrid Winegrape Varieties on Long Island

Researcher: Alice Wise, Cornell Cooperative Extension of Suffolk County

Project Cost: \$10,000

Project Summary: In order to align with increasing grower and consumer interest in reducing pesticide use, a 0.5-acre block of hybrid winegrapes will be maintained at the Long Island Horticultural Research and Extension Center, Riverhead. Currently, nine hybrid varieties are planted, four of those in May 2022. Vine phenology and growth characteristics, pest susceptibility and yield component data will be collected. Fruit provided to local winemakers will enable wine production, allowing growers to gauge suitability both in the vineyard and in the marketplace.

Topic: Effect of Spotted Lanternfly Feeding on Grapevine Mineral Uptake and Hormone Responses

Researcher: Flor E. Acevedo, The Pennsylvania State University Lake Erie Regional Grape Research and Extension Center

Project Cost: \$22,894

Project Summary: Spotted lanternfly feeding has strong detrimental effects on grapevine health, but the number of insects per vine that should trigger management actions is unknown. This proposal aims to determine the effects of different spotted lanternfly densities (insects per vine) on grapevine mineral uptake and hormone concentrations. The results of this project will help determine spotted lanternfly management actions by identifying the number of insects per vine that compromises the plant's ability to uptake nutrients and mount immune responses.

Topic: Evaluation of Fungicide Efficacy, Spray Intervals and Timing, Crop Load on Powdery Mildew Leaf Disease Development on Concord Grape

Researcher: Bryan Hed, Penn State Lake Erie Regional Grape Research and Extension

Project Cost: \$14,634

Project Summary: Previous research established a clear relationship between leaf powdery mildew, Concord leaf photosynthesis, crop size, and the achievement of minimum standards of ripeness by harvest (Gadouryabet al. 2001). However, there is still a fair amount of guesswork regarding the number and quality of powdery mildew fungicide sprays to apply later in summer to achieve 16 brix by harvest, especially when crop size is above average. This project is designed to expand the research-based knowledge from which growers can determine their powdery mildew control strategy - based on crop size - by examining and comparing the effects of new and existing fungicides, at various spray intervals, spray timings, and program lengths, on powdery mildew disease development on Concord grape. The results will provide an update on powdery mildew control strategies, with the goal of maximizing fruit and leaf health, and the accumulation of sugar soluble solids during the 4-6 weeks after veraison, at minimum cost.

Topic: Side by Side Evaluation of Clones and Hybrids of Vitis Vinifera "Riesling" in the Lake Erie Region of PA

Researcher: Bryan Hed, Penn State Lake Erie Regional Grape Research and Extension

Project Cost: \$15,237

Project Summary: Vitis vinifera 'Riesling' is an economically important variety for commercial wine production in the Northeast and Mid-Atlantic regions of the U.S., including Pennsylvania and New York. With all the clones and hybrids of Riesling available for commercial production, the side-by-side comparison of clones/hybrids in this project (clones 90/12, 110/17, 198/9, 239, and hybrids Geisenheim (Riesling x Chancellor) and NY81 (Riesling x Cayuga:)) would provide important knowledge for making decisions regarding which ones to plant. We will compare the viticultural characteristics (phenology, vegetative growth, cluster/berry weight, yield, cluster architecture), bunch/sour rot susceptibility, cold hardiness, and fruit composition, of these clones/hybrids, and record their responses to pre bloom and post bloom mechanical defoliation, and how it relates to canopy microclimate, disease development, and fruit yield and quality. In this final year of the project (2023), we will investigate the potential causes of any differences between these clones/hybrids and propose recommendations.

Topic: Expanding the Range of Rapid Analysis Approaches to Semi-Polar Volatiles and Non-Volatile Precursors in Grapes

Researcher: Dr. Gavin Sacks, Cornell University

Project Cost: \$115,126

Project Summary: Targeted measurements of volatiles or volatile precursors in grapes are useful for grape and wine quality evaluation, but these analyses are typically slow, and routine fee-for-service analyses are typically prohibitively expensive. Our lab has developed a new approach, sorbent sheets (SPMESH), coupled to direct-analysis in real time mass spectrometry (DART-MS), for increasing throughput and decreasing costs for routine volatile analyses. This project will validate SPMESH-DART-MS on commercial grape and wine samples submitted by New York State wineries and vineyards using a commercial prototype. The proposed work will also develop

new rapid SPESH-DART-MS methods for currently inaccessible compounds. Finally, the SPESH approach will be evaluated for real time sampling directly from tanks e.g., during fermentation or storage.

Topic: Teaching Consumers to Love New York Native/Hybrid Grape Wines – Develop Education & Communications Strategy

Researcher: Gregory A Gardner, PhD, State University of New York at Potsdam

Project Cost: \$9,830

Project Summary: This project is designed to develop effective data-driven approaches to communicating with and educating wine consumers and wine professionals, at defined levels of expertise, about the diversity and quality of New York State wines, including those produced from native and hybrid grape varieties. The project draws on existing research into consumer's assessment process for wine, based on individual levels of expertise, as well as the impacts of verbal descriptions and other sensory inputs.

Topic: Veraison to Harvest Newsletter and Fruit Sampling 2023

Researcher: Chris Gerling, Cornell AgriTech

Project Cost: \$26,464

Project Summary: Since 2007, The Veraison to Harvest newsletter has been a joint effort of grape and enology extension programs throughout New York. This weekly newsletter provides growers and winemakers with timely information on fruit ripening (objective metrics such as Brix, TA, pH, and YAN, sampled from 50-80 vineyards throughout NY), regional updates on harvest issues, any suggested adjustments to winemaking practices due to the weather in a given season, and brief articles highlighting current research projects and activities as they happen.

Topic: Increasing the Reliability and Scope of NEWA Weather & Pest Model Information

Researcher: Jennifer Phillips Russo, Lake Erie Regional Grape Program

Project Cost: \$54,996

Project Summary: NEWA, <http://newa.cornell.edu>, gives end users free access to 40 IPM, crop management, and degree day tools driven by weather data from weather stations primarily located on farms. In a 2007 survey, apple, grape, onion, and potato growers in NY using NEWA reported that they can save, on average, \$19,500 per year in spray costs and prevent, on average, \$264,000 per year in crop loss as a direct result of using NEWA pest forecast tools. This tool is essential to the success of our grower stakeholders. There is a critical need for a technician's time to be devoted to installing, monitoring, and maintaining the weather network to keep a robust stream of data flowing to NEWA to ensure that the pest model information is reliable. A number of the disruptions in the stream of weather data can be diagnosed and corrected by a simple phone call, while others require a visit to the station to correct the problem.

Topic: Cold Hardiness Monitoring and Microclimate Optimization of Grapevines in NY 23-24

Researcher: Jason Londo, Cornell AgriTech

Project Cost: \$39,744

Project Summary: Growing grapes in New York is a delicate balance between cultivar, environment, and consumer demand. One of the leading limiting factors is our winter climate and the vine's ability to survive acute cold events. This proposal aims to continue the dormant bud cold hardiness monitoring of grapevines in the Finger Lakes and Lake Erie regions and to better understand the climate variation that occurs across the region in the winter season. In addition, we propose to expand our assessment of vine winter physiology and begin to develop the data needed to model fruit growth and ripening during the growing season.

Topic: Evaluating Vision-Guided Spray Technology for Selective Sucker Control in Grapes

Researcher: Lynn Sosnoskie, Cornell School of Integrative Plant Sciences

Project Cost: \$13,649

Project Summary: Chemical removal of basal grape suckers via contact herbicides may be undesirable because of crop injury potential, environmental impact concerns, and changing public perceptions about pesticide use. Banded applications directed at the root stock are also wasteful as the herbicides are over-applied 1) when suckers are small or absent and 2) if applied to weed-free soil between vines. Results from 2022 NYWGF-supported research trials at Cornell's Lake Erie Research and Extension Laboratory (CLEREL) showed that a commercially available, vision-guided, precision-spray system (Weed-It) controlled suckers in Concord grapes as well as a continuous herbicide spray while, at the same time, used less product. The 2023 project will 1) describe the limits of vision-guided, precision-spray technology on sucker detection and removal and 2) describe reductions in herbicide use and off-target deposition when using vision-guided, precision-sprayers relative to continuous directed applications.

Topic: Understanding Late-Season Damage from Grape Berry Moth

Researcher: Greg Loeb, Cornell AgriTech

Project Cost: \$13,060

Project Summary: Growers continue to experience problems with grape berry moth (GBM), especially late in the season. Insecticide resistance and changes in flight phenology are two possible explanations. Over the past several years, we have found that one of the commonly used pyrethroid insecticides, fenpropathrin [Danitol], has provided little if any control of GBM, raising the prospect of insecticide resistance. Poor timing of insecticide applications may also be contributing to the problem. Using grapes at CLEREL, we propose to evaluate the efficacy of different pyrethroid insecticides commonly used by NY grape growers, plus several labeled alternatives, to determine if resistance is playing a role in ineffective control of GBM. Simultaneously, we will also monitor female GBM activity in relation to degree day accumulation at several vineyard sites with a history of high GBM pressure to evaluate how well spray timing recommended by the NEWA GBM phenology model corresponds to female GBM egg-laying.

Topic: Distribution of Tree of Heaven & Assessing Risks for SLF Establishment in NY Vineyards

Researcher: Greg Loeb, Cornell AgriTech

Project Cost: \$24,456

Project Summary: The invasive Spotted Lanternfly (SLF), a large planthopper originally from Asia, has been spreading from its center of invasion in Pennsylvania to neighboring states, including New York, where it represents a serious threat to the grape industry. The invasive tree species Tree of Heaven (TOH) is a preferred food source of SLF and is closely associated with first detection of SLF in a new area. Hence, we propose to work with vineyard owners and managers to map out the distribution of TOH adjacent to Finger Lakes vineyards and initiate a targeted SLF monitoring program in this important grape production region. If successful, we propose to expand the program to other important grape producing areas and ultimately test the hypothesis that treating trap TOH trees adjacent to high value vineyard blocks is effective in managing SLF risk.

Topic: Driving Rogueing to Manage Viruses in Diseased Vineyards

Researcher: Marc Fuchs, Cornell AgriTech

Project Cost: \$39,488

Project Summary: Leafroll and red blotch viruses have detrimental impacts on vine vigor, fruit production and quality in vineyards of New York. Rogueing, i.e., the elimination of infected vines and their replacement by clean vines, reduces the prevalence of viruses in vineyards. A pending challenge for growers adopting rogueing is the accurate identification of infected vines; this is because many confounding biotic and abiotic factors impede visual diagnostics. To facilitate the recognition of infected vines for rogueing, our proposal provides a solid technical foundation for (i) laboratory-based virus testing of candidate vines selected by growers to reliably identify virus-infected plants, and (ii) guiding the implementation of rogueing decisions by growers. This project will facilitate the adoption of rogueing as a virus disease management strategy, limit virus

prevalence in vineyards, increase vineyard profitability, reduce production uncertainties, and enhance the competitiveness of the New York grape and wine industries.

Topic: Plant Protection Sensing to Improve Sustainable Grape Disease Management

Researcher: Katie Gold, Cornell AgriTech

Project Cost: \$36,284

Project Summary: While the development of digital viticulture tools has been growing, advances in digital disease management have lagged. Fungicides are crucial tools for NY grape production, but overuse has financial and resistance consequences. If growers had a way to non-destructively monitor for plant protection status via in-field fungicide activity, they could reduce fungicide usage and expenditure by maximizing product and lengthening application intervals. We recently discovered that fungicide activity can be non-destructively detected with handheld hyperspectral sensing in regions of light beyond what human eyes can see (Gambhiret al, in review). Our project will evaluate the scalability of fungicide detection with hyperspectral proximal and remote sensing to improve sustainable grape disease management.

Topic: Upcycling Grape Pomace as Dietary Alternative to Antibiotic Growth Promoters in Broiler Production

Researcher: Dr. Elad Tako, Cornell University

Project Cost: \$59,557

Project Summary: Grapes have the highest production volume by weight of any fruit in the U.S.; however, 20% of volume remains as pomace after processing, and its disposal can cause environmental and economic issues. Antibiotic growth promoters (AGPs) added to poultry feed pose a threat of antibiotic resistance entering the food system. In this project, we propose utilizing GP as an alternative to AGPs in broiler feed. Our goal is to repurpose GP as a novel broiler feed additive to improve growth performance, enhance meat quality, and reduce feed costs and mortality. Building on our current observations, the investigation of GP as a natural alternative to AGPs in poultry feed, and its assessment in a long-term feeding trial, will allow the development of optimized processes and implementable guidelines for pomace use and waste management, potentially resulting in a new market for grape pomace. This proposal is directly associated to this year's priority theme of vineyard sustainability.

Topic: Use of A High Throughput Assay to Detect Insecticide Resistance in Drosophila Melanogaster

Researcher: Jeffrey Scott, Cornell University

Project Cost: \$57,361

Project Summary: Sour rot is a devastating disease of wine grapes in NY. Management is achieved by late season control of vectors (fruit flies) of the disease. Insecticide resistance in *Drosophila melanogaster* is severe and widespread in NY. Current assays for resistance are time consuming and of low resolution. We will use a new, rapid, high throughput assay to monitor resistance to spinetoram (Delegate) that is starting to evolve in NY vineyards. Results will provide the information needed to better manage the use of Delegate, prolong its efficacy, and protect NY vineyards.