

NYWGF RESEARCH - FINAL REPORT

Funding for fiscal year: 2025

SECTION 1:

Project title: Optimizing Fruit Color of 'Vincent' and 'Ives'

Principal Investigator with contact info: Terry Bates, trb7@cornell.edu

Co-PI Collaborators with contact info: Dan Sprague, Ted Taft, Scott Ebert

New Research **Continued Research**

Amount Funded \$ 7080.00

SECTION 2:

Project Summary Impact Statement:

'Vincent' and 'Ives' are interspecific hybrid varieties with relatively higher color than other eastern US grown grapevines. Both varieties have been selected by processors for their color stability in final beverage products but further investigation is needed to understand how to optimize color in the vineyard.

Objectives:

The main objective for 2024 was to establish a range of crop load treatments in the Vincent and Ives research plots at CLEREL and measure primary fruit characteristics (Brix, TA, pH, and color) from veraison to harvest.

Materials & Methods:

This research was conducted on a 2016 planting of Vincent and Ives (1 acre each) at the Cornell Lake Erie Research and Extension Laboratory. The vines were ownrooted and planted at an 8.5' row x 6' vine spacing and trained to a 6' high bilateral cordon with a metal stake at each vine. The following pruning/fruit thinning treatments were applied to whole vineyard rows in a randomized complete block design with four treatments and three replicate blocks.

- Treatment 1: Manually pruned to 60-80 nodes to remain consistent with previous years for seasonal comparisons.
- Treatment 2: Machine pruned with manual pruning follow-up to target ~120 buds/vine
- Treatment 3: Same as #2 but with mid-season mechanical fruit thinning to remove 25% of the crop estimate.
- Treatment 4: Same as #2 but with mid-season mechanical fruit thinning to remove 50% of the crop estimate.



Figure 1: Mechanical pre-pruning implement and grape harvester used.

Mechanical pre-pruning was done with a modified OXBO sprawl pruning head run twice to a row. In the first pass, canes were combed downward and cut to the desired length with sickle-bar pruners. On the second pass, canes were combed upward with disk pruners run under the cordon to trim out shaded wood. Crop estimation was conducted at 30 days after bloom with an OXBO 6030 grape harvester.

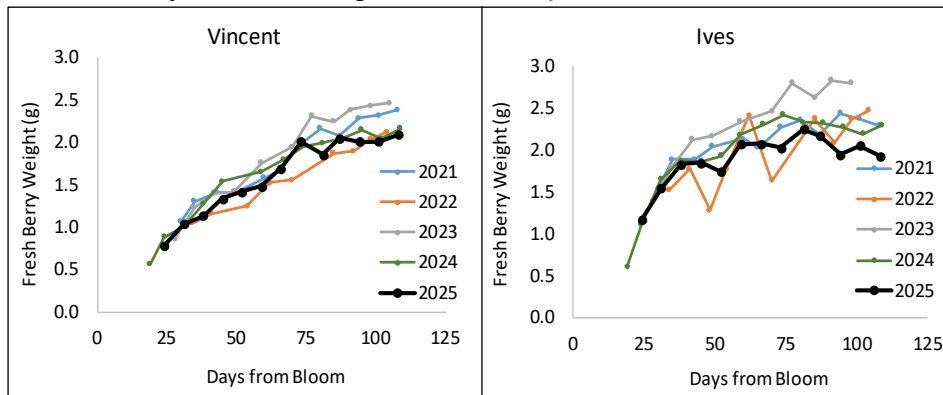
A general berry curve fruit sampling was collected weekly from each variety from 20 days after bloom until harvest. From August 13th to September 24th, a 100-berry sample was randomly collected from each treatment row to measure fresh berry weight, juice soluble solids, and juice titratable acidity, pH, and absorbance at 520 and 430 nm (to be done this winter).

Results/Outcomes/Next Steps:

The Fresh Berry Weight Curve was Similar to Previous Seasons

Crop estimation was performed on both varieties on July 18th, 2025 by clean picking six-vine plots with an OXBO 6030 mechanical harvester. Fruit was weighed off of the harvester with a bin scale, and a berry sub-sample was collected for current berry weight. The final crop prediction was calculated by estimating the final berry weight and applying a multiplication factor to the current weight. For 2025, we used the Concord Crop Estimation calculator, with some modification for the difference in berry curves.

<https://www.efficientvineyard.com/blog/concord-crop-estimation-calculator-beta>

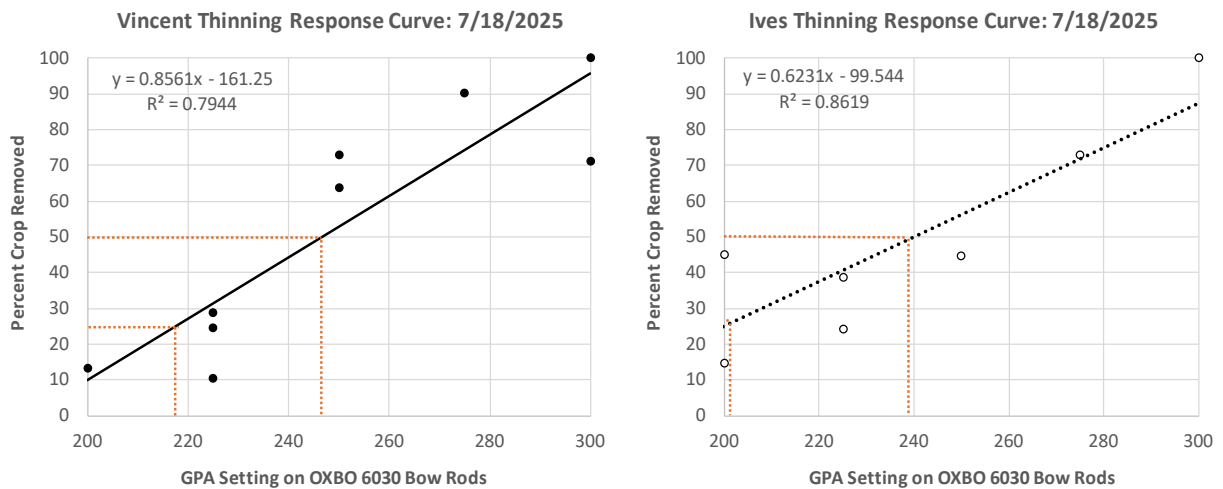


The fresh berry curve for Vincent (left) and Ives (right) for 2021-2025.

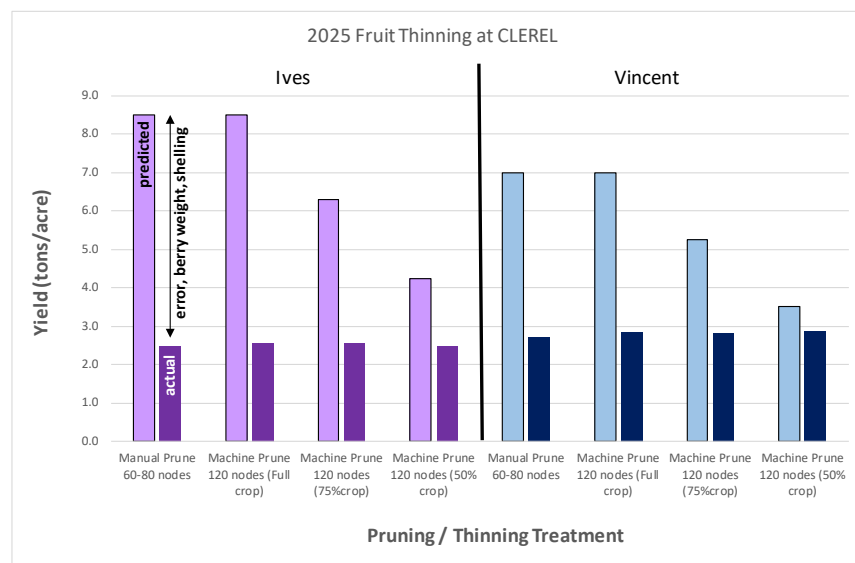
When comparing Vincent and Ives fresh berry curves, Vincent demonstrates less seasonal variation, has no distinct lag phase, and did not show a response to the 2025 late-season drought conditions. In contrast, Ives had more seasonal variation and noticeable late-season dehydration.

Mechanical Fruit Thinning Gave Yield Differences but Pre-Harvest Fruit Shelling was a Confounding Factor

In 2024, we learned that Vincent and Ives do not respond the same to mechanical thinning and that unique response curves were necessary for each variety. In 2025, two thinning response curves were generated by increasing the shaker head rpm's in a stepwise fashion and measuring the amount of fruit removed. Then shaker head settings were selected to remove 25% and 50% of the crop for each variety.



2025 Thinning response curves for Vincent (left) and Ives (right)

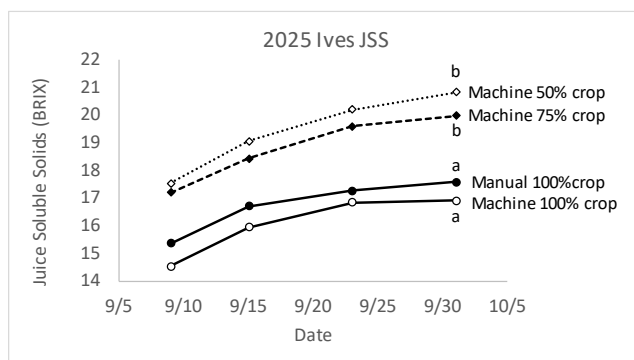
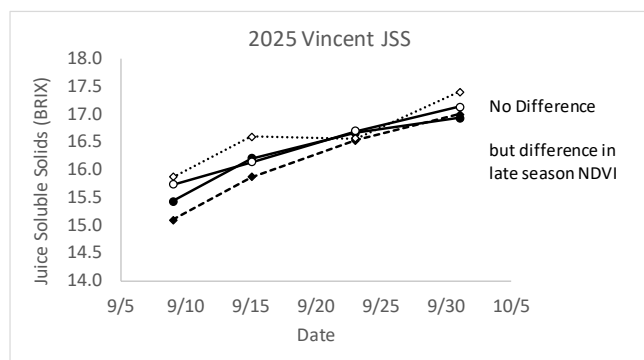


2025 Predicted and actual yield of Ives and Vincent

While observing and NDVI scanning these vineyards during the season, we believe the fruit yield for each treatment was close to the targets of 100%, 75%, and 50% crop (roughly 4-8 tons/acre). However, there was late season drought in these vineyards and there was significant fruit shelling the week before commercial harvest which caused all treatments to drop to 2-3 tons/acre.

Crop load treatments impacted Ives fruit more than Vincent in 2025

Fruit was collected from veraison to harvest by crop load treatments and measured (or currently being measured) for berry weight, juice soluble solids, titratable acidity, juice pH, and color. In 2025, there was an effect of crop load on juice soluble solids in Ives leading to a 4-degree BRIX difference at harvest between 100% crop and 50% crop treatments. There was no juice soluble solids difference in Vincent crop load treatments; however, there was a difference in late season canopy reflectance. Possibly, under stress (crop load or drought), Vincent may partition available resources into the fruit while sacrificing vegetative growth. Ives, on the other hand, maintains vegetative growth while sacrificing fruit maturation. Juice color, TA, and pH are currently being analyzed in the CLEREL lab.



2025

Variety	Treatment	Juice Soluble Solids (Brix)				Yield (tons/acre)	Aug NDVI
		9-Sep	15-Sep	23-Sep	1-Oct		
Ives	Manual Prune 60-80 nodes	15.37 B	16.70 B	17.27 B	17.57 B	2.49	0.749
Ives	Machine Prune 120 nodes (Full crop)	14.53 B	15.93 B	16.83 B	16.90 B	2.55	0.775
Ives	Machine Prune 120 nodes (75%crop)	17.20 A	18.43 A	19.60 A	19.97 A	2.55	0.772
Ives	Machine Prune 120 nodes (50% crop)	17.53 A	19.07 A	20.20 A	20.83 A	2.47	0.763
		0.0013	0.0020	0.0021	0.0033	NS	NS
Vincent	Manual Prune 60-80 nodes	15.43	16.20	16.67	16.93	2.72	0.807 AB
Vincent	Machine Prune 120 nodes (Full crop)	15.73	16.13	16.70	17.13	2.83	0.776 B
Vincent	Machine Prune 120 nodes (75%crop)	15.10	15.87	16.53	17.00	2.81	0.822 A
Vincent	Machine Prune 120 nodes (50% crop)	15.87	16.60	16.57	17.40	2.85	0.822 A
		NS	NS	NS	NS	NS	0.0418

SECTION 3:

Project summary and objectives:

The 2025 project focused on optimizing fruit color and quality in 'Vincent' and 'Ives' grape varieties through crop load management. Conducted at the Cornell Lake Erie Research and Extension Laboratory, the study aimed to test a range of pruning and fruit thinning treatments. The goal was to measure key fruit characteristics—Brix, titratable acidity, pH, and color—from veraison to harvest. Treatments included manual and mechanical pruning, with varying levels of mechanical fruit thinning to remove 0%, 25%, or 50% of the estimated crop. This work builds on previous years to better understand how crop load affects fruit development in these varieties under New York growing conditions.

Importance of research to the NY wine industry:

This research is important for the New York grape industry for several key reasons:

1. **Improved Fruit Quality:** Managing crop load through precise mechanical thinning can enhance fruit uniformity and optimize color development, which is critical for processing grapes like 'Vincent' and 'Ives' used in juice and wine production.
2. **Adaptation to Weather Challenges:** The 2024 spring frost highlighted the vulnerability of vineyards to climate variability. By fine-tuning thinning strategies, growers can adapt more effectively to fluctuating yields caused by weather extremes.
3. **Cost-Effective Mechanization:** Mechanical pruning and thinning reduce labor costs, which is especially valuable as the industry faces increasing challenges in accessing affordable, skilled vineyard labor.
4. **Data-Driven Management:** This study provides local, research-based guidelines for crop load management, helping New York growers make informed decisions specific to their varieties and growing conditions.
5. **Sustainability and Yield Consistency:** Efficient crop load management helps maintain vine balance and sustainability, reducing biennial bearing (crop load swings year-to-year) and supporting consistent production, which is vital for long-term contracts and market stability.

Overall, this work supports a more competitive, resilient, and profitable grape industry in the region.

Project Results/next steps:

This project focused on optimizing the fruit color of hybrid grape varieties 'Vincent' and 'Ives' for use as blending grapes. The research involves manipulating crop loads through pruning and mechanical thinning to track how fruit characteristics like sugar levels and color develop from veraison to harvest. While the 2025 season faced challenges—including late-season drought and canopy collapse that led to premature fruit shelling and lower yields than predicted—the data showed significant differences in sugar accumulation for 'Ives' based on crop load, whereas 'Vincent' remained more consistent. Looking forward to 2026, the team requests continued funding to repeat these trials in hopes of a "clean" weather season that allows for more stable data collection and further refinement of crop estimation procedures.