NYWGF RESEARCH - FINAL REPORT

Funding for fiscal year: 2024-2025

SECTION 1:

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

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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.

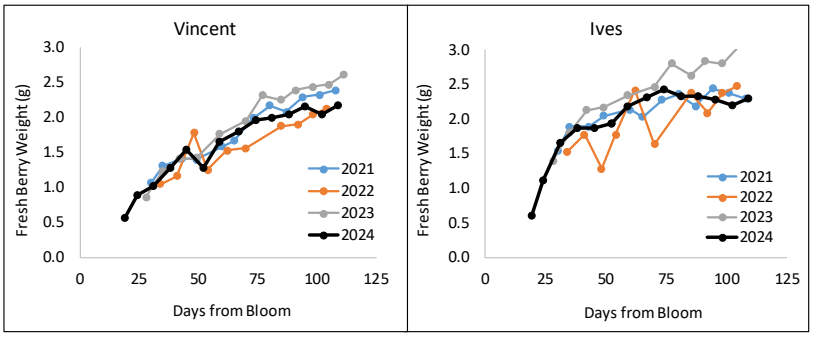
Mechanical pre-pruning was done with a modified OXBO sprawl pruning head run twice to a row. In the first pass, canes were combed downward and cut to the desired length with sickle-bar pruners. On the second pass, canes were combed upward with disk pruners run under the cordon to trim out shaded wood. Crop estimation was conducted at 30 days after bloom with an OXBO 6030 grape harvester. Because of high vine growth, enhanced by the 2024 spring frost and low crop size, mechanical fruit thinning was purposefully delayed until just pre-veraison, and the same harvester unit was used.

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:

<u>The Fresh Berry Weight Curve was Similar to Previous Seasons</u>

Individual vines, six per variety, were clean picked at 30 days after bloom for crop estimation. Final crop prediction was based on a final berry weight estimate of 2.37 g for Vincent and 2.62 g for Ives (an average for the past three years). Final berry weight in 2024 was less than predicted with 2.1 g for Vincent and 2.3 for Ives.

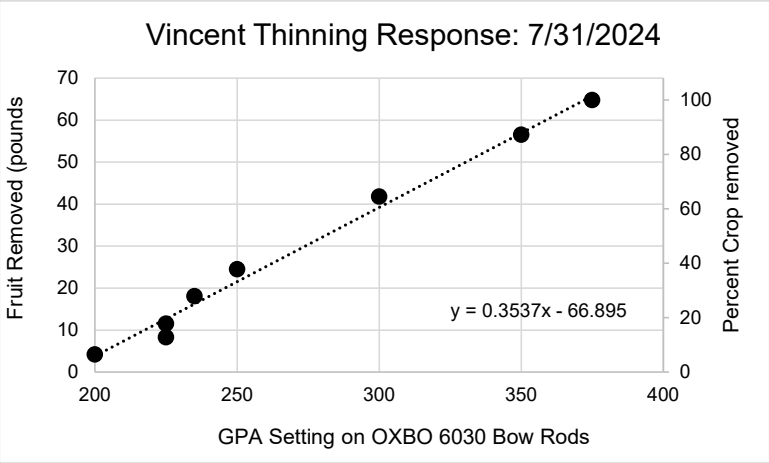


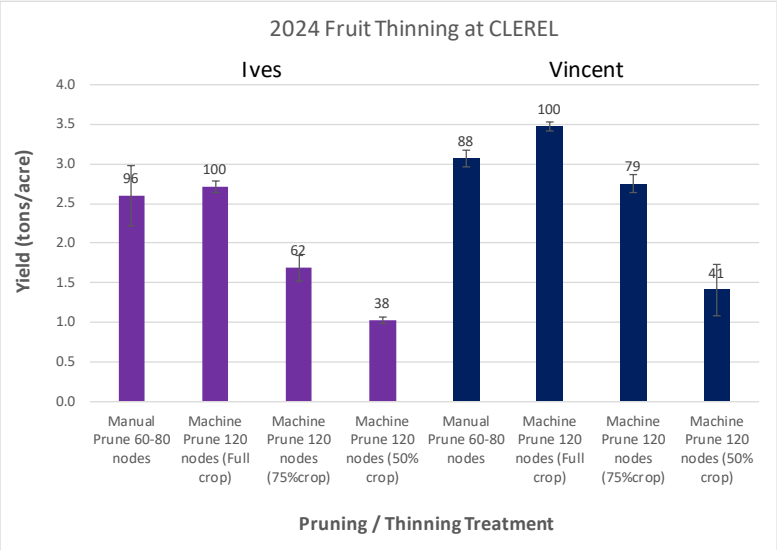
The fresh berry curve for Vincent (left) and Ives (right) for 2021-2024.

Mechanical Fruit Thinning Successfully Gave a Range in Harvest Yield

This was our first attempt at fruit thinning these varieties. On July 31, a test row of Vincent was used to establish a machine thinning response by stepping up the harvester beater bar RPMs every six vines and measuring the fruit removed. Rates which approximated 25% and 50% crop removal were then used in experiment rows. We did not do a separate test row for Ives. In Vincent, the two thinning rates resulted in 21% and 59% crop removal. In Ives, the same thinning rates resulted in 38% and 62% fruit removal.

The overall crop size of unthinned vines was low because of the 2024 spring frost (2.5-3.5 tons/acre). Manual pruning (80-100 buds) gave similar yields to Machine pruning to 120 nodes with no fruit thinning.





1. There was a positive machine thinning response for Vincent. We did not do a separate one for Ives but we will next year based on 2024 results.
2. The fruit is just starting to change color. We were able to thin berries, not whole clusters, at veraison. The clusters on Vincent and Ives seem tighter and stronger than Concord so we were concerned that we would thin clusters and not individual berries.

3. The two varieties do not have the same thinning response curve. We took off more crop in Ives at the same machine rate. This may also have to do with the size of the berries and the size of the canopies, Ives > Vincent in both cases.

Mechanical Fruit Thinning Caused a 6-10% Reduction in Berry Weight but No Difference in Juice Soluble Solids

From veraison to harvest, Fresh berry weight and juice soluble solids were measured weekly from each treatment. Heavy fruit thinning (50% fruit removal target) resulted in slightly smaller berries by approximately 6-10% compared to unthinned vines. Lighter fruit thinning, typically recommended in commercial situations, did not cause a significant reduction in berry weight.

There was no difference in Brix between any of the treatments. Again, the crop was already low because of the spring frost and it is not surprising that thinning to an even lower crop did not improve the rate of sugar accumulation.

		Fresh Berry Weight (g)						
Variety	Treatment	13-Aug	20-Aug	27-Aug	3-Sep	10-Sep	17-Sep	24-Sep
Ives	Manual Prune 60-80 nodes	2.32	2.47	2.42	2.46 A	2.38 A	2.27 A	2.35
Ives	Machine Prune 120 nodes (Full crop)	2.32	2.47	2.46	2.39 AB	2.38 A	2.25 AB	2.35
Ives	Machine Prune 120 nodes (75%crop)	2.35	2.41	2.27	2.30 AB	2.30 AB	2.18 AB	2.38
Ives	Machine Prune 120 nodes (50% crop)	2.23	2.35	2.19	2.16 B	2.06 B	2.08 B	2.14
		NS	NS	NS	0.0305	0.0217	0.0396	NS
Vincent	Manual Prune 60-80 nodes	1.87	2.04 A	2.08 A	2.10	2.30	2.19 A	2.21 AB
Vincent	Machine Prune 120 nodes (Full crop)	1.85	1.93 AB	1.97 AB	2.10	2.17	2.08 A	2.26 AB
Vincent	Machine Prune 120 nodes (75%crop)	1.79	1.98 AB	2.03 A	2.00	2.07	2.03 A	2.12 AB
Vincent	Machine Prune 120 nodes (50% crop)	1.69	1.87 B	1.90 B	1.96	2.04	1.87 B	2.07 B
		NS	0.0301	0.0052	NS	NS	0.0017	0.0233

		Juice Soluble Solids (Brix)						
Variety	Treatment	13-Aug	20-Aug	27-Aug	3-Sep	10-Sep	17-Sep	24-Sep
Ives	Manual Prune 60-80 nodes	9.57	12.00	14.03	15.53	17.07	18.50 AB	19.13
Ives	Machine Prune 120 nodes (Full crop)	9.47	11.93	13.90	15.53	16.30	17.27 B	18.23
Ives	Machine Prune 120 nodes (75%crop)	10.10	12.13	14.37	16.07	17.70	19.37 A	19.30
Ives	Machine Prune 120 nodes (50% crop)	10.57	12.27	13.87	15.60	17.83	19.27 A	18.93
		NS	NS	NS	NS	NS	0.030	NS
Vincent	Manual Prune 60-80 nodes	12.13	13.67	15.13	15.53	16.17	17.13	17.23
Vincent	Machine Prune 120 nodes (Full crop)	12.23	13.47	14.87	15.27	15.73	17.40	17.67
Vincent	Machine Prune 120 nodes (75%crop)	11.37	13.90	15.57	15.90	15.57	16.63	17.30
Vincent	Machine Prune 120 nodes (50% crop)	11.47	13.20	15.13	15.70	16.23	17.13	17.33
		NS	NS	NS	NS	NS	NS	NS

Technology Transfer Plan:

Final results of this project will be posted on the Efficient Vineyard website (https://www.efficientvineyard.com/). A mechanical fruit thinning demonstration field day is being planned at CLEREL with the LERGP extension team.

SECTION 3:

Project summary and objectives:

The 2024 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:

The 2024 project successfully implemented a range of crop load treatments on 'Vincent' and 'Ives' grapevines to assess their impact on fruit quality. Mechanical fruit thinning using a modified harvester created distinct yield levels, with higher crop removal observed in Ives compared to Vincent. Heavy thinning slightly reduced berry weight by 6–10%, but there was no significant effect on juice sugar content (Brix), likely due to already low crop loads from spring frost. The fruit on both varieties began coloring at veraison, and the thinning process targeted individual berries rather than whole clusters, which worked well given their cluster structure. We intend to repeat this experiment in 2025 because of the compromising frost in 2024 and to gain multi-year data collection.