NYWGF RESEARCH - FINAL REPORT

Funding for fiscal year: 2024-2025

SECTION 1:

Project title: Development of resilient and high-quality wine grape varieties

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New Research ☒ Continued Research ☐

Amount Funded $ 30,000

SECTION 2:

Project Summary Impact Statement: This project supported the grape breeding cycle to develop new and improved wine grape varieties with high winemaking quality that survive and thrive in New York and the greater Northeastern grape-growing area. This included making new crosses, evaluating new breeding families from 2023 crosses, in-vineyard evaluations of promising seedlings and selections, winemaking and chemical analysis for 2024 harvest, and wine sensory analysis for 2022 and 2023 vintages. These data are critical in the evaluation and advancement of top selections for future commercialization of new varieties. These efforts will ultimately support the long-term sustainability of the grape and wine industry in New York through the development and release of new high value varieties that are disease resistant, productive, and well-adapted to our climate region.

Objectives: The aim of this project was to breed new grapevine varieties that are cold hardy, are disease resistant, and produce high quality wine. To do this, the objectives of this work were to:
1) Evaluate new crosses and selections for cold hardiness and disease resistance in the lab and in the vineyard, using both traditional and high-throughput methods
2) Evaluate juice and wine quality for early and late-stage selections,
3) Establish commercial trials for advanced selections and prospective varieties.

Materials & Methods:
Evaluated grapevines included breeding family seedlings from 2023 crosses in the low-spray nursery, single-vine seedlings in seedling vineyards, and 6-vine plantings of early and

advanced selections in second-test vineyards in the Cornell AgriTech Cornell Grape Breeding Program vineyards. New breeding family seedlings from 2023 crosses were pre-screened using molecular markers for previously identified disease resistance genes, with financial and technical support from a different external grant. Those with high disease resistance potential were planted into our low-spray nursery for phenotypic evaluations of disease resistance and early vigor. Single-vine seedlings were evaluated in seedling vineyards for viticultural traits and disease resistance. Early and advanced selections were evaluated for viticultural traits, disease resistance, cold hardiness, and enological potential. In the 2024 season, select vineyards were imaged with the Cornell-developed PhytoPatholoBot (PPB; Thompson, 2022) to test and develop models for image-based evaluation of diseases.

Families and individuals in the low-spray nursery were evaluated throughout the season for vigor / growth and rated for disease incidence for powdery mildew and downy mildew, notes and discards were also made based on other diseases or abnormalities as they appeared. Seedlings from the 2023 nursery were planted into our seedling vineyards and propagated selections were planted into second-test vineyards.

Single-vine seedlings were visually assessed for viticultural potential including overall vigor, cold damage, disease incidence (foliar and fruit powdery mildew, downy mildew, and black rot). Visual disease rating system is as follows: 1 = 1-3% foliar infection, 2 = 3-12%, 3 = 12-25%, 4 = 25-50%, 5 = >50%. Notes were also collected on general fruit / cluster set and characteristics, bunch rots, and other diseases, abnormalities, or notable characteristics as they appeared.

Second-test selections were evaluated for viticultural and enological characteristics. Second-test selections were visually rated based on overall vigor, cold damage, foliar and fruit disease incidence (powdery mildew, downy mildew, black rot), and cluster/fruit characteristics (productivity, size, compactness, color). We also measured cane pruning weight, harvested yield (cluster number, cluster weight, and berry weight per vine), and mid-winter cold hardiness for a designated set of selections. Mid-winter cold hardiness was measured by collecting buds and using freezing experiments following standard protocols for Differential Thermal Analysis (DTA) to detect the low temperature exotherm peak (Mills et al. 2006) to determine the LTE50 (predicted temperature that is lethal for 50% of buds) with three replicates of 8 buds each and Concord included in all experiments as a cold-hardy control.

Early and advanced selections were harvested and evaluated for juice chemistry (pH, soluble sugars, and acidity). Wine selections were vinified through standard vinification processes at the Cornell Vinification and Brewing Lab. Reds were fermented on the skins with yeast strain GRE, and malolactic fermentation was induced with LAB culture VP41. Whites were pressed, settled overnight, racked, and inoculated with yeast strain EC1118. Wine chemistry (pH, titratable acidity (at pH 8.2), fermentable sugar, malic acid, lactic acid, volatile acidity, alcohol) was measured using the OenoFoss (FTIR) and HPLC at the Cornell Craft Beverage Analytical Lab. Wine sensory evaluations for the breeding program 2022 and 2023 vintages were performed using an invited industry and collaborator sensory panel. Evaluations included nose and palate quality ratings, overall hedonic score, and the presence of specific varietal characteristics or defects.

Based on current and historical evaluations, the most promising seedlings were selected for propagation into second-test vineyards; and the most promising candidates for release were identified among the advanced selections to be slated for commercial trails. We are working with commercial nurseries to propagate and distribute promising potential varieties and identifying New York grape grower participants, out-of-state partners, and university-based collaborators to trial potential varieties prior to commercialization.

Results/Outcomes/Next Steps:

Breeding Cycle Progress

In 2024, we made 17 new crosses for both wine and table grape markets, resulting in 8171 new seeds which each represent a new unique individual. We planted and evaluated 435 seedlings in our low-spray nursery. We planted 402 new vines into our seedling vineyards for their first vineyard evaluations and 34 new selections into our second test vineyards for further evaluations. Over 1000 individual seedlings were assessed in the seedling vineyards for viticultural potential and 168 selections were evaluated in second-test vineyards. A total of 63 selections were harvested, vinified, and underwent juice and wine chemistry analysis. 71 wines from 2022 and 2023 harvest, representing 57 selections, were evaluated by an industry and collaborator volunteer sensory panel. Over 3500 seeds from 2024 crosses were stratified and planted in the greenhouse for evaluation and selection during the 2025 season.

Breeding families and individuals in the nursery and single-vine individuals in the seedling vineyards were observed, evaluated, and then considered for discard, slated for continued monitoring, or advanced for further evaluation. Based on seedling observations, 11 disease resistant wine selections and 4 new table grape selections were propagated for evaluation in the second-test vineyards.

Viticultural Trait Evaluation

Distribution of foliar and fruit disease ratings for recent selections in our low-spray second-test vineyards planted since 2021 are presented in Figure 1. These data represent the highest disease level observed across the season. Notable foliar downy mildew (DM) was observed, even on some our more disease resistant selections in 2024. This is likely due to a combination of conducive weather conditions and a highly virulent strain of DM. Powdery mildew (PM) resistance was strong on fruit and foliage with little to no break-through on all disease resistant selections. Molecular selection has only been possible for foliar DM and PM, thus higher levels of black rot (BR) are present in the disease resistant selections. Nevertheless, most selections are also moderately to highly resistant to BR as shown by data. Susceptible control vines planted throughout the low-spray vineyards presented at disease levels of 4-5 for all foliar PM, DM, and BR, and at 5, 5, and 3 for PM, DM, and BR on fruit, respectively.

Mid-winter cold hardiness was assessed between 1/21/25 and 1/24/25 and is presented in Figure 2. Data represents the LTE50 which is the predicted temperature at which 50% of buds will freeze. Concord, Cayuga White, and Chambourcin were included in the annual analysis and figure for comparison. Due to limited capacity, only new selections and promising selections with limited data were assessed.

For all harvested selections, mean fruit yield per vine and average cluster weights were measured. Distribution of fruit yield data on a per vine basis for 2024 harvested selections

are presented in Figure 3. Pruning weights were measured in pounds per vine and averaged across the 6 vines for designated selections. Due to limited time and budget, pruning weights were only measured for new selections with adequate years of growth and promising selections with limited data. Distribution of pruning weight data is presented in Figure 3.

Wine Quality Analysis

Average data from the 2024 tasting event for 2022 and 2023 vintages are summarized in Table 1. Overall hedonic score (general pleasantness and likability), nose, and palate were assessed on a scale of 1 to 9. Panelists were asked to mark if notes of muscat or labrusca were present, and the total count of tasters (out of 15-20 tasters present) who marked those characteristics for each wine are presented in Table 1. Panelists also provided sensory notes based on flavors and aromas detected in each wine (data not shown). Chambourcin or Cayuga White were included in at least one flight for all panels as controls. Table 2 presents selected juice and wine analysis data from 2024 harvested white wine, red wine, and juice market selections. These wines and juices will be assessed using a trained and standardized sensory panel in 2025, and those wines of highest ranking will be shared and evaluated in an industry and stakeholder tasting event.

Next Steps

We will continue the breeding cycle by making new crosses, evaluating the new 2024 families, assessing potential of seedlings, propagating new selections for evaluation, and continuing evaluation of new and advanced selections. Additionally, we will put effort into integrating new technologies, such as the PhytoPatholoBot (PPB) robotic imaging and analysis, into our vineyard assessments to better standardize and improve efficiency of vineyard ratings.

We will continue to integrate data over time to identify top selections based on overall performance in the vineyard and in the tasting panels (Table 3). By averaging and tracking year to year variation and performance, we are able to better assess commercial potential of top selections.

In 2025, we will be using a two-tiered approach to sensory analysis. We have assembled a panel of 18 panelists and will be holding two training sessions to standardize our sensory analysis and then at least five tasting events to evaluate all 2024 wines. Wines from the most promising selections will then be selected to be shared and evaluated at industry, stakeholder, and collaborator tasting events.

Technology Transfer Plan:

The ultimate goal of this work is the release of new high-value varieties for production in New York and the greater growing region. A critical stage before variety release is commercial trialing. To facilitate this, the most promising top selections have been and will continue to be shared with collaborating nurseries to evaluate, propagate, and distribute with industry partners for commercial trialing. Additionally, we are working with research collaborators to evaluate top selections in different growing regions, including the Midwest, Southeast, and Southern United States.

Attachments:

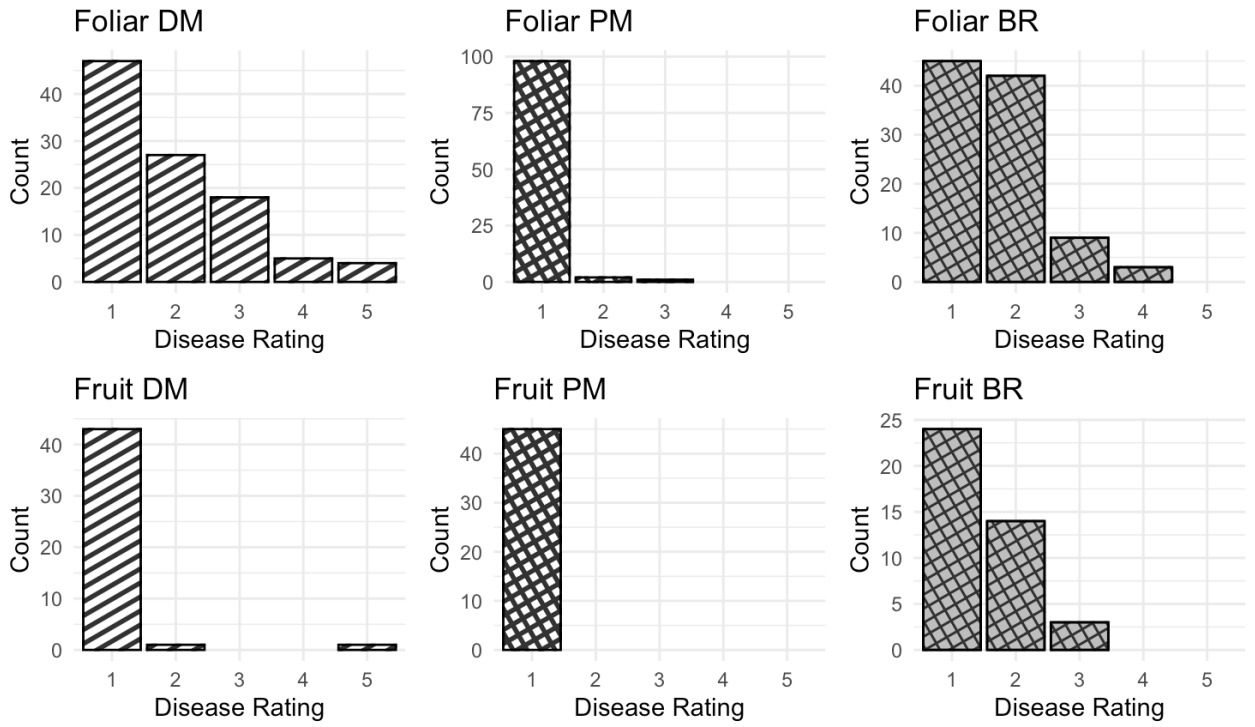

Figure 1. Disease ratings for selections in low-spray second-test vineyards, for foliar and fruit downy mildew (DM), powdery mildew (PM), and black rot (BR). Rating system: 1 = 1-3% incidence, 2 = 3-12%, 3 = 12-25%, 4 = 25-50%, 5 = >50%

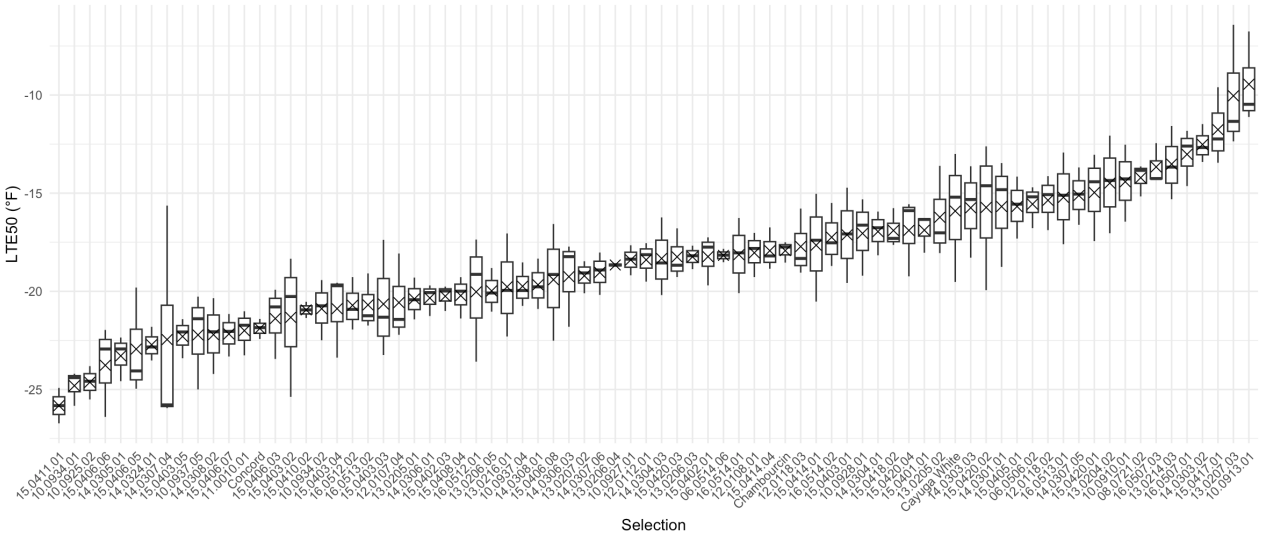

Figure 2. Mid-winter cold hardiness of new and advanced selections. Box plots represent predicted temperature that is lethal for 50% of buds (LTE50) based three replicates with 8 buds each, collected 01/21/25 - 01/24/25. X represents the mean LTE50.

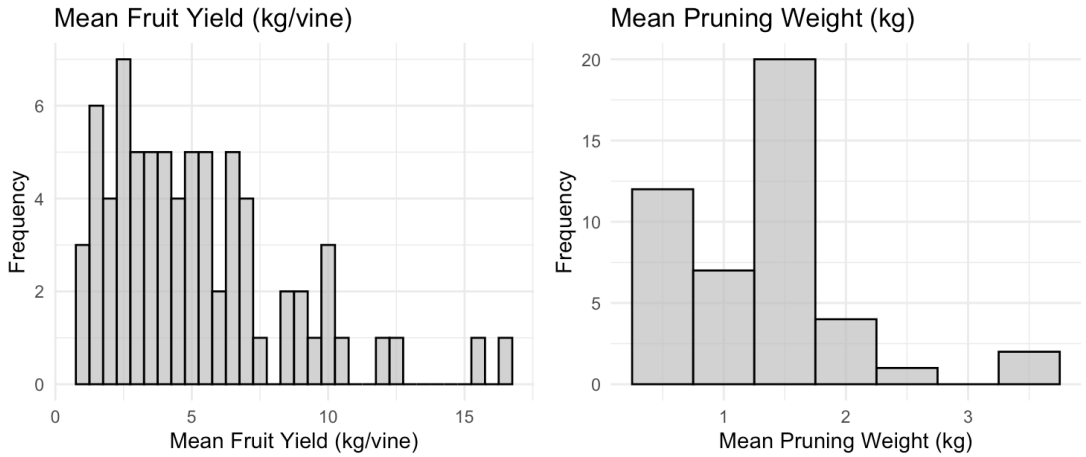

Figure 3. Histograms of mean fruit yield (kg/vine) and mean pruning weight (kg/vine) measured in 2024 based on 6 vine averages for each selection.

Table 1. Average sensory panel results from 2022 and 2023 vintages, tasted in July 2024, sorted by market group and from lowest to highest average hedonic score, representing overall likeability. Disease resistant variety (DRV) * indicates a disease resistant selection. + Number indicates how many panelists marked muscat or labrusca notes (out of 15-20 total).

Selection	*Year*	*DRV*	*Average Hedonic Score*	*Average Palate Score*	*Average Nose Score*	*Muscat*[+]	*Labrusca*[+]
			Red Selections				
08.0702.03	22		3.62	3.83	3.43		1
08.0702.02	22		3.64	3.84	3.84		1
13.0214.03	23	*	3.67	3.52	3.70	1	
08.0709.02	22		3.71	4.18	3.56		1
12.0106.01	23	*	3.76	4.00	4.09		1
14.0305.01	23	*	3.94	3.56	4.38		1
08.0710.01	22		4.00	4.69	3.29		
12.0107.04	23	*	4.43	4.48	4.60		2
08.0702.03	23		4.57	4.33	4.37		
08.0702.01	22	*	4.67	4.78	4.13		1
10.0937.04	23		4.82	4.80	5.00	1	
06.0514.06	22	*	4.88	5.24	4.45		
14.0308.01	23	*	4.91	4.81	5.24		1
10.0937.05	22		4.97	5.03	4.88		
Chambourcin	22		5.01	5.21	4.82		1
12.0108.01	23	*	5.21	5.32	5.26		
Chambourcin	23		5.26	5.24	5.03		3
06.0514.06	23	*	5.33	5.19	5.50		1
12.0108.01	22	*	5.37	5.32	5.05		
15.0406.05	23	*	5.52	5.33	5.21	1	1
10.0925.02	22	*	5.78	5.94	5.00		
10.0925.02	23	*	5.94	6.00	5.89		

14.0307.04	23	*	5.94	5.83	6.22	2	
14.0307.06	23	*	6.06	6.17	5.89	2	
			White Selections				
14.0301.01	23	*	3.24	3.14	3.43		
15.0420.01	23	*	3.72	3.74	3.58	1	1
12.0107.03	22	*	3.78	3.90	4.03		2
14.0324.01	23	*	3.89	4.00	3.68	2	2
12.0107.03	23	*	4.00	4.00	4.06	2	
13.0216.01	23	*	4.09	4.06	4.68	2	
13.0214.01	23	*	4.17	4.18	4.23	2	2
13.0205.01	22	*	4.25	4.65	3.88	1	4
12.0118.02	22	*	4.42	4.42	4.42		2
13.0206.02	22	*	4.42	4.47	4.47	3	1
13.0204.02	23	*	4.44	4.76	4.32	1	1
10.0928.01	22	*	4.50	4.39	4.56	3	3
15.0410.02	23	*	4.53	4.53	4.68	1	
13.0205.01	23	*	4.67	4.88	4.12	2	
12.0112.01	22	*	4.69	4.81	4.65	1	4
11.0013.01	22		4.78	4.93	4.50	3	4
13.0205.02	22	*	4.80	4.75	4.53	1	2
10.0934.01	23	*	4.82	4.67	5.24	3	1
08.0721.03	22		4.84	5.00	4.65	1	5
12.0118.01	22		4.84	4.94	4.47	3	2
14.0306.01	23	*	4.98	4.95	4.67	1	
10.0934.01	22	*	5.00	4.79	5.05	1	1
10.0927.02	23	*	5.06	4.88	5.09	2	
13.0207.03	23	*	5.11	5.21	5.21	5	
08.0721.02	22		5.26	5.26	4.75	2	5
15.0420.02	23	*	5.28	5.28	5.32	6	3
15.0406.03	23	*	5.34	5.09	5.47	2	4
13.0206.05	23	*	5.35	5.33	5.39	3	2
Cayuga White	23		5.41	5.47	5.24	7	3
Cayuga White	22		5.49	5.43	5.28	4	2
13.0205.02	23	*	5.50	5.53	5.35	4	3
11.0010.01	22		5.53	5.45	5.52	10	2
12.0112.01	23	*	5.69	5.74	5.32	3	2
14.0304.03	23	*	5.69	5.32	5.55	5	2
09.0815.01	22		5.76	5.53	6.00	2	3
10.0927.01	23	*	5.84	5.53	6.12	7	3
13.0206.04	23	*	5.89	5.32	6.11	10	1
11.0010.01	23		5.90	5.65	6.14	10	1
14.0307.05	23	*	6.10	5.86	5.95	12	3

10.0928.01	23	*	6.29	5.58	6.68	16	1
				Juice Selections			
15.0403.02	23	*	5.61	5.68	5.63		2
15.0402.01	23	*	5.72	5.95	5.32		1
15.0403.01	23	*	6.41	6.26	5.58		2
15.0416.01	23	*	6.63	6.68	6.47		5

Table 2. 2024 harvest juice and wine analysis results for white wine, red wine, and juice market selections.

Selection	*Harvest Date*	*Harvest Brix*	*Harvest pH*	*Harvest TA (g/L)*	*Harvest YAN (mg N/L)*	*Ethanol (%)*	*Wine pH*	*Wine TA (g/L)*
				White Selections				
15.0411.01	8/26/24	19.2	2.83	23.6	179	10.8	3.02	16.5
14.0324.01	8/26/24	22.0	2.82	18.3	96	12.7	3.10	11.1
13.0207.02	8/26/24	18.5	2.75	16.3	125	11.7	3.06	11.2
13.0206.02	8/27/24	18.4	2.76	19	55	11.7	2.99	11.4
Cayuga White	9/3/24	16.8	3.03	12.8	246	11.7	3.39	7.6
10.0927.02	9/3/24	15.3	2.70	22.5	133	11.4	2.96	15.1
10.0934.02	9/3/24	20.1	3.06	14	125	11.6	3.29	8.8
10.0928.01	9/3/24	19.1	2.95	13.9	81	11.8	3.28	8.6
13.0206.03	9/4/24	20.1	2.95	10.4	62	11.8	3.16	6.6
15.0406.07	9/4/24	20.4	2.84	18.2	227	11.2	3.12	12.4
15.0420.04	9/4/24	20.6	2.83	15.5	97	11.8	3.12	11.0
16.0512.01	9/4/24	20.0	2.78	19.6	83	11.2	3.02	14.6
16.0512.02	9/4/24	21.1	2.89	12.9	50	12.1	3.27	8.9
14.0303.03	9/9/24	19.7	2.87	12.83	28	11.8	3.12	8.9
15.0410.02	9/9/24	18.6	2.90	13.49	63	11.5	3.17	8.7
16.0513.02	9/9/24	19.4	2.88	14.44	49	11.4	3.06	10.4
15.0414.04	9/9/24	18.3	2.83	12.72	82	11.7	3.14	8.8
14.0306.01	9/9/24	19.1	2.86	12.42	51	11.3	3.23	7.4
13.0204.02	9/9/24	20.9	2.86	15.12	51	11.5	3.13	10.1
13.0216.01	9/10/24	19.2	2.89	16.75	38	10.9	3.10	11.7
15.0420.02	9/10/24	19.7	2.88	15.27	202	11.8	3.25	8.9
13.0206.05	9/10/24	17.9	2.86	11.94	52	12.2	3.02	7.5
13.0214.01	9/10/24	19.6	2.83	18.9	140	10.9	3.10	13.4
11.0010.01	9/10/24	18.0	2.77	18.06	189	11.0	3.12	12.3
10.0934.01	9/10/24	18.6	2.84	15.18	143	11.2	3.17	10.2
12.0118.02	9/11/24	19.5	2.84	14.07	169	11.2	3.26	7.6
12.0112.01	9/11/24	18.6	3.03	10.42	103	11.9	3.22	6.6
12.0107.01	9/11/24	18.6	2.68	20.44	107	11.4	3.11	10.9
13.0205.02	9/11/24	19.1	2.89	17.09	162	11.1	3.22	9.6
15.0418.02	9/16/24	18.5	2.81	10.73	167	11.5	3.23	6.7

15.0417.01	9/16/24	20.9	3.06	7.42	118	12.3	3.07	6.32
15.0420.03	9/16/24	19.8	2.80	14.55	66	11.3	3.27	8.1
12.0107.03	9/16/24	18.6	2.75	18.28	76	11.3	3.10	11.0
14.0301.01	9/17/24	18.6	2.95	16.22	99	11.5	3.20	11.2
15.0420.01	9/17/24	20.2	2.92	14.72	69	11.2	3.28	10.4
14.0304.01	9/17/24	20.0	2.70	20.1	64	10.9	3.06	14.1
13.0206.04	9/17/24	21.6	2.96	10.87	289	12.6	3.17	6.8
14.0307.05	9/17/24	20.4	2.96	11.66	295	11.6	3.30	7.1
14.0304.03	9/18/24	18.2	3.00	8.53	311	11.7	3.19	6.9
12.0118.03	9/24/24	19.2	2.90	11.1	117	11.6	3.19	7.1
15.0406.03	9/24/24	19.9	2.93	14.0	223	11.2	3.24	9.5
10.0927.01	9/25/24	19.9	3.02	12.1	202	11.0	3.34	8.0
16.0507.01	9/25/24	25.4	3.28	5.5	42	14.5	3.21	6.0
13.0205.01	9/30/24	18.7	2.85	10.1	142	11.6	3.05	7.1
				Red Selections				
14.0305.01	8/27/24	19.5	2.77	26.8	116	9.7	3.39	10.5
14.0308.01	9/3/24	17.7	2.85	16.2	300	9.5	3.56	6.4
14.0308.02	9/4/24	19.9	2.76	18.0	190	9.4	3.61	7.2
15.0405.01	9/11/24	16.2	2.80	13.21	186	10.0	3.41	8.3
15.0406.05	9/11/24	18.8	2.75	13.94	110	10.5	3.46	6.3
14.0307.06	9/11/24	19.3	2.83	15.83	165	10.3	3.57	6.5
15.0406.08	9/11/24	19.7	2.82	17.88	139	10.0	3.60	6.7
15.0406.06	9/9/24	19.0	2.72	14.0	81	10.2	3.46	6.6
13.0214.03	9/9/24	18.2	2.77	26.55	160	9.9	3.56	8.9
15.0414.01	9/17/24	19.2	3.10	6.7	94	9.9	3.71	5.9
10.0910.01	9/16/24	17.1	3.22	5.5	125	10.5	3.36	6.5
06.0514.06	9/25/24	19.7	3.07	10.2	75	10.5	3.49	6.4
06.0514.06	9/25/24	19.7	3.07	10.2	75	10.5	3.50	6.4
10.0925.02	9/25/24	18.4	3.09	11.0	123	9.6	3.58	7.3
Chambourcin	9/25/24	19.3	2.99	14.0	166	10.6	3.46	8.5
16.0507.03	9/30/24	18.6	3.01	12.8	64	9.1	3.67	7.3
12.0108.01	9/30/24	18.1	3.11	9.9	113	9.8	3.77	6.1
12.0107.04	9/30/24	17.2	2.96	15.0	114	9.3	3.55	8.2
10.0937.04	10/1/24	19.0	2.88	23.3	329	9.2	3.68	8.1
14.0307.04	10/15/24	18.8	2.92	15.76	107	10.1	3.49	7.2
				Juice Selections				
15.0403.03	9/4/24	19.0	2.83	8.7	174			
16.0514.02	9/17/24	18.9	3.19	7.07	105			
16.0513.01	9/30/24	17.9	2.86	10.8	27			
15.0403.01	9/4/24	19.3	3.17	14.5	289			
15.0403.05	9/4/24	22.4	3.00	14.8	182			
15.0402.01	9/4/24	19.5	3.13	18.5	218			

16.0514.01	9/9/24	23.9	3.33	12.1	191
15.0403.04	9/11/24	27.9	3.16	12.0	298
15.0401.01	9/16/24	18.1	3.01	11.5	232
15.0402.03	9/16/24	20.0	2.99	11.6	174
15.0403.02	9/25/24	17.0	3.04	8.1	29

Tables 3a and 3b. Historical average data for the most promising white (a) and red (b) wine selections. Average values across noted years of data collection for brix at harvest, titratable acidity (TA) at harvest, TA of finished wine, wine tasting overall hedonic score (pleasantness), foliar powdery mildew (PM) and downy mildew (DM), fruit yield per vine, cluster weight, berry weight, pruning weight, and predicted lethal temperature to kill 50% of buds (LTE50). Cayuga White and Chambourcin varieties included as controls for comparison.

a

Selection	*DRV*	*Years of Data*	*Harv. °Brix*	*Harv. T.A. %*	*Wine T.A. %*	*Tasting Score*	*Foliar PM*	*Foliar DM*	*Yield/Vine (kg)*	*Cluster Wt (kg)*	*Berry Wt (g)*	*Pruning Wt (lb)*	*LTE50 (°F)*
					White Selections								
14.0307.05	*	23,24	19.7	1.1	1.2	6.1	1.2	2.2	3.67	0.06	1.0	3.03	-15.1
10.0927.01	*	20-24	19.5	1.3	1.3	6.0	1.3	1.5	7.30	0.14	2.4	1.75	-17.5
13.0206.04	*	23,24	20.2	1.5	1.1	5.9	1.0	1.8	3.03	0.06	2.0	0.81	-17.0
11.0010.01	*	20-24	19.4	1.5	1.6	5.8	1.5	1.5	6.00	0.06	1.4	2.49	-18.3
14.0304.03	*	23,24	18.2	0.8	1.0	5.7	1.0	1.8	4.71	0.17	1.7	2.72	-16.3
12.0112.01	*	21-24	19.3	0.8	1.0	5.6	1.0	1.7	7.29	0.11	1.3	2.63	-12.1
04.0303.04		13-16,18,19	19.8	0.9	1.0	5.5	1.6	1.9	7.58	0.10		3.64	-15.6
04.0303.02		13-17,19	18.4	1.3	1.4	5.4	1.2	1.7	7.28	0.08	2.6	4.75	-16.8
10.0928.01	*	22-24	20.1	1.3	1.4	5.4	1.0	1.8	2.99	0.07	1.6	1.93	-13.8
13.0205.02	*	20,22-24	20.4	1.3	1.4	5.4	1.3	1.8	3.51	0.09	2.2	2.80	-15.7
08.0722.01		17,19	18.9	1.2	1.3	5.4	1.2	1.7	4.55	0.16	1.2	1.68	-13.1
13.0206.05	*	23,24	18.6	1.2	1.3	5.4	1.0	1.6	5.59	0.11	1.9	0.88	-16.9
15.0406.03	*	23,24	20.1	1.5	1.5	5.3	1.0	1.2	6.47	0.22	1.8	2.05	-17.8
06.0506.02	*	13-15,17,19,21	18.9	1.4	1.1	5.3	1.0	1.1	2.59	0.12	1.6	1.12	-14.0
15.0420.02	*	23,24	20.1	1.4	1.5	5.3	1.0	1.6	2.73	0.07	1.8	2.22	-11.4
05.0403.02		13-18	21.1	1.0	1.1	5.2	1.2	2.1	3.51	0.04	1.5	3.18	-18.3
03.0207.06		12-21	19.4	1.3	1.4	5.2	1.4	2.2	7.79	0.10	1.2	2.21	-17.8
06.0514.09	*	15,18,19	20.6	1.0	0.7	5.2	1.3	1.3	5.46	0.12			
13.0207.03	*	23	17.0	1.1	1.2	5.1	1.0	1.6	2.70	0.10	2.4	2.25	-10.3
03.0208.09		11,13-18	20.2	1.1	1.3	5.0	1.6	2.4	5.42	0.08	1.8	2.70	-14.9
12.0118.01	*	21,22	19.8	1.2	1.3	5.0	1.5	1.8	4.90	0.12		1.37	-12.8
14.0306.01	*	23,24	19.6	1.2	6.7	5.0	1.0	2.2	4.82	0.13	1.6	0.93	-17.9
12.0118.02	*	21,22,24	20.0	1.1	1.2	4.9	1.3	1.7	5.21	0.14	68.3	3.14	-10.5
Cayuga White		96-24	17.5	1.1	1.1	4.9	2.4	2.0	11.17	0.18	2.7	2.53	-11.5

b

Selection	*DRV*	*Years of Data*	*Harv. °Brix*	*Harv. T.A. %*	*Wine T.A. %*	*Tasting Score*	*Foliar PM*	*Foliar DM*	*Yield/Vine (kg)*	*Cluster Wt (kg)*	*Berry Wt (g)*	*Pruning Wt (lb)*	*LTE50 (°F)*
					Red Selections								
14.0307.06	*	23,24	19.5	1.5	1.3	6.1	1.0	2.6	4.39	0.16	1.7	2.46	-15.5
14.0307.04	*	23,24	18.6	1.7	1.2	5.9	1.0	2.2	5.74	0.10	1.9	1.53	-19.4
10.0925.02	*	19-24	18.7	1.1	1.2	5.7	1.2	1.2	7.82	0.16	2.2	1.91	-19.5
15.0406.05	*	23,24	18.8	1.4	1.2	5.5	1.0	1.6	4.58	0.14	1.5	0.85	-18.6
10.0937.05		20,22	22.1	2.0	1.5	5.4	1.0	2.3	4.59	0.09		3.10	-19.4
06.0514.06	*	13-24	19.8	1.0	0.9	5.3	1.0	1.3	5.04	0.15	1.5	1.32	-15.5
08.0702.01		16-20,22	19.4	1.1	1.0	5.2	1.3	1.7	5.30	0.12	1.3	2.79	-14.5
10.0925.01	*	17,20	18.4	1.0	1.2	5.0	1.0	1.8	1.52	0.17	2.0		-15.8
06.0509.01	*	15,17,18	15.7	1.2	1.2	5.0	1.5	1.7	4.27	0.11	0.9	1.35	-14.4
10.0925.03	*	19,20,21	19.4	1.2	1.3	4.9	1.3	2.0	8.61	0.12		1.59	-13.8
14.0308.01	*	23,24	17.8	1.5	1.2	4.9	1.0	1.0	3.69	0.10	0.9	2.89	-15.8
12.0108.01	*	23,24	17.7	1.2	0.9	4.9	1.0	1.1	4.41	0.16	1.2	4.76	-13.8
Chambourcin		97-02,06-24	20.2	1.3	1.1	5.3	3.3	1.2	8.33	0.18	2.1	2.25	-13.5

SECTION 3:

Project summary and objectives:

The goal of this project is to breed new and improved wine grape cultivars that produce exceptional wine and flourish in New York and the greater Northeastern grape-growing area. These cultivars must be able to survive and produce high-quality fruit despite cold winters, early spring cold snaps, and heavy disease pressure associated with our climate region. The objectives of this work are to develop new grapevine varieties for our growing region, and evaluate their potential for commercialization based on disease resistance, cold hardiness, productivity, fruit characteristics, and wine quality. This requires an iterative process of crossing, evaluation, and selection to identify, characterize, and trial the top candidates for release.

Importance of research to the NY wine industry:

This project will support the long-term sustainability of the grape and wine industry in New York through the development and eventual release of new high-value cultivars that are well-adapted to our region. Disease resistance is a key target of these breeding efforts, which support economic and environmental sustainability by reducing pesticide use. Additionally, identifying candidate cultivars with climate resilience traits will support productive and profitable grape production despite variable weather patterns in our changing climate. Finally, through this work we carefully evaluate wine quality to ensure that the winemaking potential of new cultivars are aligned with industry and consumer preferences.

Project Results/next steps:

In this project we continued the breeding cycle, making new crosses of disease resistant and high-quality parents, evaluating new breeding families, assessing potential of seedling vines, and characterizing advanced selections to assess commercial potential. We have identified a few top selections, which are being propagated by collaborating nurseries to begin commercial trials. Over 70 wines were evaluated by a sensory panel in 2024 to assess the winemaking potential of over 50 selections. We harvested and vinified 63 selections, which will be evaluated for quality in 2025. Through this work, we will identify and release new high-value cultivars to support the grape and wine industry in New York.