NYWGF RESEARCH - FINAL REPORT

Funding for fiscal year: 2022

SECTION 1:

Project title: Breeding and evaluation of new wine grape varieties with improved cold tolerance and disease resistance

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New Research ☐ Continued Research ☒

Amount Funded $31,182

SECTION 2:

Project Summary Impact Statement: Two new varieties were released in 2013 (‘Aromella’ and ‘Arandell’), and wines were commercially marketed soon thereafter. In 2020, Briedé Family Vineyards ‘Arandell’ wine won a Silver Medal at the 2020 International Wine and Spirits Competition – Sommelier Challenge; and Silver at the 2021 Virginia Governor’s Cup; while an ‘Aromella’ wine from Weymouth Winery (Ohio) won a double gold at the 2022 San Francisco Chronicle Wine Competition. Prior releases such as ‘Cayuga White’ (1972), ‘Chardonel’ (1991), ‘Traminette’ (1996), ‘Noiret’ (2006), ‘Corot noir’ (2006), ‘Valvin Muscat’ (2006) and ‘Geneva Red’ (2003) have garnered widespread acclaim and account for millions of dollars of wine production annually in New York and in other eastern states. A new white wine grape, ‘Aravelle’, was officially introduced during the BEV-NY 2023 conference. This grape variety makes wine comparable to its ‘Riesling’ parent and has elevated levels of cold hardiness and disease resistance. Its rot resistance is especially notable, as it represents a great improvement over ‘Riesling’.

Objectives: Provide eastern winegrowers with grape varieties of superior wine quality, which are better adapted to our growing conditions and are sustainable in response to climate change. New selections will be developed by the Cornell Grape Breeding Program and screened for cold response and disease resistance. The field performance of new selections from the Cornell program and accessions from other sources will be recorded. The wine aroma and texture profile of new selections is to be comparable to the quality found among vinifera grapes and/or unique and valued by panelists and the wine consumer. The wine flavor profile of potential new grape varieties will be assessed by producing wine samples and characterizing their chemical and sensory properties.

Materials & Methods

1. Geneva-based primary evaluation of new varieties and selections: There are three stages to the introduction of a new cultivar to the industry. The first evaluation step uses single vine seedlings to test vineyard potential. Also at the seedling stage, we now employ molecular marker technology to pre-select the most disease resistant seedlings prior to nursery planting – this process is very efficient and successful. For especially promising seedlings, microvinifications allow the assessment of juice chemistry along with preliminary evaluations of wine potential. The second step is to propagate and plant six vines of promising candidates from step one. In addition to providing more years to observe viticultural characteristics, these "2nd test" vines receive more careful management and can provide sufficient fruit for larger lot vinification, allowing more complete assessment of wine sensory characteristics. The third step is to propagate sufficient vines for testing in commercial vineyards and research trials in NY and in other states (as described below). The NE-2220 project (Multi-State Evaluation of Winegrape Cultivars and Clones) is a good vehicle for this stage of testing. Not only does NE-2220 provide information on viticultural adaptation to different soils and climates, but this third testing stage provides larger quantities of grapes to allow a more complete evaluation of wine quality potential. Selections are vinified in larger batches and with varying winemaking techniques to explore the flavor range more fully.

Growth and yield of advanced selections from the Geneva Grape Breeding Program are characterized in AgriTech vineyards. Selections are also tested for cold tolerance and disease resistance. A large portion of our program focuses on breeding highly disease resistant varieties with superior wine quality. Selections that show viticultural potential are fermented using a standard protocol (one for white wines, one for red wines). The best single vine seedlings are also fermented (when sufficient amounts of fruit are produced) for early assessment of wine potential. The effects of different winemaking techniques on wine composition and quality are often studied in more detail using the larger quantities of fruit produced by the most advanced selections.

2. Cooperative Testing Program: Trials of the most promising breeding program accessions take place in commercial vineyards as well as with NE-2220 university cooperators in multiple states. Two commercial nurseries, Double A Vineyards and Amberg Grapevines, distribute advanced breeding program selections to researchers as well as growers. We then seek out feedback on performance from anyone testing Cornell grapevine selections. In cooperation with commercial growers, Geneva selections are vinified either at commercial wineries or at Cornell AgriTech to assess potential wine quality, and test options for vinification.

Test plantings with cooperating commercial growers satisfy several needs. They allow for evaluation of adaptation to multiple commercial sites. They also provide sufficient grapes for commercial scale evaluation by cooperating wineries and Cornell's Wine Research Program,

and they ensure that sufficient propagation wood is available at the end of the evaluation period to meet the needs of commercial nurseries.

Techniques employed: Data collection in 2nd test Geneva vineyards includes (commensurate with funding availability): Cane pruning weight, cluster number, cluster weight and crop weight per vine. In mid-winter, the temperature at which 50% bud kill occurs is determined by differential thermal analysis (Mills et al. 2006), and shootless nodes, if any, are recorded in the spring. As other funding sources permit, seedlings are screened for genetic markers indicating the presence of genes required for disease resistance. Seedlings are further screened during the summer in a no-spray nursery, and only disease-resistant seedlings are planted to a permanent no-spray vineyard. Juice samples are analyzed for soluble sugars, pH and total acidity. Wines are produced using standard vinification techniques. White wine grapes are crushed, pressed, and inoculated with yeast strain EC 1118 (Lallemand) and fermented at 20°C. Grapes for red wine production are crushed and fermented on the skins for 7-10 days, depending on cultivar and lot size. Red wines are fermented with yeast strain GRE (Lallemand) at 25°C and inoculated for malolactic fermentation. Chemical analyses are done by FTIR (Foss WineScan), HPLC (Agilent), and enzymatic methods. Yeast assimilable nitrogen (YAN) is measured using the NOPA (Dukes and Butzke, 1998; <http://tinyurl.com/ay4ym2>) for primary amino acids, and enzymatic methods for ammonia ion content. Chemical and sensory analyses are performed to rank wines.

All wines are screened sensorially by a trained panel, and rated for nose and palate quality, overall hedonic score, and the presence of various varietal characteristics. Advanced selections are further characterized through fermentation of larger wine lots divided into replicates for parameter testing, including but not limited to trials of harvest dates, skin contact time, and yeast and ML strain.

Data analysis: We collect vineyard data for >30 selections annually, most of which are vinified as well to assess wine quality. Due to the large number of selections under evaluation, they are planted in plots of six vines each, without further replication. New selections are added to the trials each year. Observations are recorded annually, but statistical analysis is not appropriate for data based on single plots of several vines planted in different years. Therefore, the data accumulated over the course of several years is used to determine which selections have the most promising combinations of vineyard and wine characteristics. These selections are then designated for testing with growers and cooperating researchers. This approach is significant for the wine industry since valuable data can be obtained from studying the response to different growing conditions (locations) over multiple years, and in many cases, from replicated trials.

Results/Outcomes/Next Steps:

<u>Wine Evaluations:</u>

Twenty-nine lots of wine (18 white, 11 red including a red and a white control) were made from breeding program selections and cultivars in 2022. One additional selection was hot-pressed and frozen for later analysis of juice quality. Brix, pH, titratable acidity, and yeast assimilable nitrogen (YAN) were analyzed at harvest, and musts were chaptalized to 20˚Brix if necessary. Reds were fermented on the skins with yeast strain GRE, and malolactic fermentation induced with LAB culture VP41. Whites were pressed, settled overnight, racked, and inoculated with yeast strain EC1118. All wines were analyzed for pH, titratable acidity, and organic acids (tartrate, malate, lactate, and acetic) via HPLC, and will be screened by a trained sensory panel.

Sensory evaluation: After the pandemic delay, wines from 2019, 2020, and 2021 were evaluated by panels of scientists, technicians, winemakers, and students in early September, 2022. The results are incorporated into Table 3.

Our most notable achievement in the 2022/23 funding period was the official naming and release of NY81.0315.17. We announced the new name, 'Aravelle', at the BEV-NY conference in Syracuse on March 28, 2023. Significant industry in this new variety led to its release, and we expect to see varietal wines of 'Aravelle' on the market in the near future. Application has been made to the US Dept. of Treasury, Tax and Trade Bureau, to add 'Aravelle' to the official list of Grape Variety Names permitted on wine labels. A plant patent application is pending.

As this is a final report, rather than provide the usual summary of crosses made, types of data collected, etc., I am electing to focus this report on a summary of the most promising selections in the Cornell Grape Breeding program. This listing includes some that have been described/summarized in past reports as well as others that are now showing promise following the tasting of 2019, 2020, and 2021 wines. As usual, viticultural data are included in Table 1 (for selections under a typical hybrid spray program), and Table 2 (for selections managed with 0 to 2 sprays per season). Table 3 summarizes wine data for selections listed in Tables 1 and 2.

'Aravelle' (formerly NY81) – Consistently ranks very high for wine quality; descriptor list includes muscat notes, intense floral, peach and citrus, tangerine, lemon/lime, grapefruit, apple, pear, and honey. Measurements indicate that 'Aravelle' is 1 to 2 ^{o}F hardier than 'Riesling' (according to temperature of 50% bud kill in mid winter). As a bunch rot resistant alternative to 'Riesling', it shows promise in New York and elsewhere. Own-rooted vines are weak and decline over time. Grafting is required. 'Aravelle' is currently available via Double A Vineyards (Fredonia) and Amberg Grapevines (Clifton Springs). See official release handout, attached.

NY01.0609.01 – This red wine grape produced a very highly ranked and unique wine from vintage 2011, characterized as expressing muscat character with notes of rose and violet. Since 2012, it has been fermented "as a white" to investigate the possibilities of producing a muscat rosé style wine. The color of vintage 2012 was more orange than pink, and some tasters found foxy/cotton candy notes while others described floral, pear, cherry and strawberry notes. The 2013 vintage was also well-liked. Panelists detected some pleasant labrusca notes, along with cherries, cranberry, strawberry, and currants. Only one taster (of eleven) noted muscat character. Vines are very productive (Table 1), with large clusters and have good resistance to powdery and downy mildews under a hybrid spray program. The predicted temperature for 50% bud kill is -13.2 ^{o}F.

NY03.0207.06 – This white wine selection produces a good canopy with moderate resistance to foliar powdery and downy mildews under a hybrid spray program. Fruit are mostly rot-resistance but some sour rot has been noted in some years. Wines have been highly ranked by tasting panels, with aromas described as melon, pear, spicy and pineapple, while the palate descriptors included good structure and body; and mentions of citrus, pineapple, apple and Riesling-like characters. The predicted temperature for 50% bud kill is -17.4 ^{o}F.

NY08.0702.01 – Having *V. vinifera* 'Grand noir' in its heritage, this red wine selection is listed due to high hedonic ratings from vintages 2019 and 2020. Disease resistance is very good under a hybrid spray program. The fruit ripen late, on loose ¼ lb. clusters, with minimal fruit rot. The predicted temperature for 50% bud kill in midwinter is -14.5 °F.

NY10.0937.05 – This selection produced a highly-rated red wine (in 2020) and descends from *V. vinifera* 'Albariño'. Resistance to downy mildew is moderate, and resistance to powdery mildew is high. Botrytis bunch rot has not been observed. The fruit ripen late and the predicted temperature for 50% bud kill in midwinter is -18.5 °F. One significant limitation has been the very high titratable acidity (20 g/L) yet the wines have been well received after adjustment. Wine was made in 2022 but hasn't yet been evaluated.

SELECTIONS FROM THE DISEASE RESISTANCE BREEDING PROGRAM:

NY06.0514.06 – a highly disease resistant red wine selection. This selection carries the *Run1 / Rpv1* genes for powdery and downy mildew resistance from the muscadine grape, as well as *Ren2* (for powdery mildew resistance) from *V. cinerea*. Also has excellent resistance to bunch rot, and moderate resistance to black rot. Dormant buds are moderately winter hardy, with expected temperature of 50% bud kill in mid-winter measured to be -15 °F. Vines are on the small side and grafting on phylloxera-resistant stocks should be tested. Fruit yields seem low (Table 2) due to the use of many clusters for crossing each year; spurs are not fruitful at the base, as well. Wine descriptors are as follows: fruity with notes of blackberry, plum, cherry; slightly herbaceous, with green pepper noted; good body and medium tannin; also, some have detected chocolate notes.

NY10.0925.02 – a highly disease resistant teinturier wine selection. This 2010 cross has been quite productive since data gathering began in 2019. The weight of fruit per vine in 2022 averaged 18.0 lbs. Fruit are usually harvested in late September and there was about 5% rot in 2022. Primary buds are hardy to approximate -14 °F. Sugar, acidity and pH are well-balanced, and recent wines have been very well liked by taste panels. Taster comments included fruity, cherry, tannin, earthy, and very good body.

NY06.0506.02 – a highly disease resistant white wine selection. This cross from 2006 has been tested for wine quality between 2013 and 2021, but the main concern is low yield and small vine size. It should be tested on a phylloxera-resistant rootstock, and bird damage should be prevented as well. Primary buds are hardy to approximate -13.8 °F. Wines have been very well-liked with some tasters noting muscat and terpene aromas. Other comments included tropical, pineapple, peach, honey and spicy aromas. Acidity at harvest tends to be high.

NY10.0927.01 – This highly disease resistant white wine selection descends from 'Gewürztraminer' via 'Traminette' and 'Aromella'. Primary buds are hardy to approximate -12 °F. Vines are medium sized and produce one-third lb. clusters that were harvested in early October, 2022. About 10-15% fruit rot was noted in 2022. Though acidity tends to be on the high side at harvest, this selection has received very high marks from taste panels, with the following descriptors: muscat, big palate, apricot, lime, citrus, tangerine, balanced and focused. Some tasters noted hints of labrusca as well.

NY11.0010.01 – This white wine selection has moderately strong disease resistance, though

it is the only one on this list of resistant selections that does not harbor the *Run1 / Rpv1* genes for powdery and downy mildew resistance from the muscadine grape. Its ancestry includes 'Muscat Ottonel' as well as 'Gewürztraminer'. The vine was very productive in 2022, with over 16 lbs. fruit per vine. Vines are vigorous and the expected temperature of 50% primary bud kill in mid winter is about -17.9 °F. Fruit were harvested in mid September 2022 with small amounts of fruit rot noted. Though titratable acidity tends to be high at harvest, wines were adjusted and taste panels gave the wines high scores. Comments ranged from grassiness likened to 'Sauvignon blanc' to muscat, tropical fruit, mango, floral and sometimes acidic.

NY12.0112.01 – a highly disease resistant white wine selection with some 'Riesling' and 'La Crescent' in its ancestry. Wine have been extremely well-liked yet in January 2023 the predicted temperature for 50% primary bud kill was -7.5 °F. This test should be repeated for additional years. Vines are vigorous and very productive; 17 lbs. fruit per vine in 2022 and some sour rot noted. Brix / pH / TA values are well-balanced. The vintage 2021 wine comments included: muscat, lychee, aromatic, floral, with nice structure.

NY12.0118.02 – a highly disease resistant white wine selection with the new German variety, 'Villaris', in its background. Mid-winter hardiness is questionable (Table 2) and needs more testing. Vines are vigorous and moderately productive with one-third lb. clusters. In 2022, fruit were harvested at a well-ripened stage with just a small amount of fruit rot. The 2021 wine was well liked with tasters noting the following: apples, peach, pear, some vegetal notes.

NY13.0205.02 – another highly disease resistant (powdery mildew, downy mildew and Botrytis bunch rot) white wine selection descending from 'Gewürztraminer' and 'Riesling'. In 2022, it was harvested on September 12 with excellent balance of sugar, acidity and pH; 5% rot noted. The expected temperature of 50% primary bud kill in mid winter is about -15.5 °F. Only the 2021 wine has been evaluated, and it was quite well-liked, with the following comments: citrus, floral, tropical fruit, lychee and muscat, along with a nice lingering finish.

NY13.0206.02 – another highly disease resistant white wine selection descending from both 'Riesling' and 'Gewürztraminer'. Only vintage 2021 has been evaluated with the 2022 wine samples yet to be tasted. Young vines were very productive in 2022 – 13.9 lbs. fruit per vine, and moderate fruit rot was noted. Fruit were picked in early September at 21 °Brix. Yet the expected temperature of 50% primary bud kill in mid winter was about -8.3 °F and should be tested further. Wine panel notes included the following: aromatic, Gewürz like terpenes, muscat, orange blossom, lychee, and floral. The 2021 wine had a very high overall score.

Though some of the most recent selections in the above list have possible limitations as noted, and may be discarded on the next 2-3 years, it is hoped that this snapshot in time summary will be useful in sorting out their potential. Further information will be needed to determine which of the selections described show enough promise to be tested with University and grower collaborators.

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Technology Transfer Plan:

Our plans to facilitate adoption of new varieties include hosting industry wine tastings at opportune times; presenting information at industry meetings; and providing publications and updates via Cooperative Extension and the Cornell Horticulture program website. Presentations describing selections and varieties from the Cornell Grape Breeding program are made at wine and grape extension meetings. We also host field visits during the summer when possible. We provide our two cooperating nurseries with information to pass along to customers wishing to test our most advanced selections.

In conjunction with the release of 'Aravelle' in March 2023, tastings of multiple commercial and experimental samples were conducted. The news release from the Cornell News Service generated three television placements, one radio talk show (Connections with Evan Dawson), and multiple articles in popular as well as industry magazines and newspapers.

Attachments: See Tables 1, 2, and 3.

SECTION 3:

Project summary and objectives: The goal of this project is to develop new grapevine varieties for New York. These should be sustainable and climate resilient, while also producing high quality red and white wines. A new white wine grape, 'Aravelle', was officially introduced during the BEV-NY 2023 conference in March. This grape variety makes wine comparable to its 'Riesling' parent and has elevated levels of cold hardiness and bunch rot resistance. There are many elite wine grape selections in the pipeline undergoing further testing.

Importance of research to the NY wine industry: New grape varieties provide choices for growers seeking to reduce pesticide usage and avoid cold damage, while not compromising on wine quality. Cornell-developed varieties such as 'Cayuga White' (1972), 'Chardonel' (1991), 'Traminette' (1996), 'Noiret' (2006), 'Corot noir' (2006), 'Valvin Muscat' (2006), 'Aromella' (2013) and 'Arandell' (2013) have garnered widespread acclaim and account for millions of dollars of wine production annually in New York and in other eastern states.

Project Results/next steps: During the course of this project, NY81 was extensively tested for viticultural and enological characteristics. A three-year assessment of seven yeast strains determined that strain 71B was preferred but in some years other strains were also well liked by panelists. In March, 2023, NY81 was officially named 'Aravelle' at the BEV-NY conference in Syracuse, NY. There are numerous new selections in the pipeline that are beginning to show promise both in field trials as well as in wine assessments. Many of these arose from efforts to develop selections with high levels of natural resistance to downy mildew, powdery mildew, and bunch rots. Viticultural and wine assessments will continue. Colleagues in Plant Pathology are working to determine how best to protect the resistance genes in new varieties; in other words, how to prevent pathogens from mutating to overcome the resistance genes. A disease control program will be necessary, but much reduced over what is normally required for hybrid varieties.

Supporting attachments: See the ‘Aravelle’ handout attached.

Table 1. Summary of vineyard characteristics of wine grape selections. Reisch and Mansfield, 2022-23 Report Appendix

Selections	Years of Harvest Data	PM	DM	Fruit wt/vine (lbs)	Cluster wt (lbs)	Pruning Weight (lbs)	50% Bud Kill (ºF)
Reds							
08.0702.01	16-20,22	1.40	1.60	11.69	0.26	2.79	-14.5
08.0702.02	16-20,22	1.00	1.60	8.62	0.26	3.91	-11.1
08.0702.03	17,19,20,22	1.00	1.50	10.96	0.22	4.25	-10.6
08.0710.01	16-22	1.00	1.33	12.61	0.27	3.07	-15.6
10.0937.05	20,22	1.00	2.00	10.12	0.20	2.74	-18.5
Chambourcin (control)	97-02,06-22	3.31	1.18	18.36	0.41	2.37	-13.2
Red Pressed as White for Rosé							
01.0609.01	09-15,17-19	1.45	1.27	27.92	0.42	3.27	-13.2
Whites							
03.0207.06	12-21	1.40	2.11	17.18	0.22	2.21	-17.8
08.0721.02	18-22	1.40	1.20	13.92	0.33	5.40	-12.2
08.0721.03	15,17-22	1.00	1.50	15.75	0.47	4.48	-10.5
08.0722.01	17-21	1.17	1.67	10.03	0.36	1.68	-13.1
Cayuga White (control)	10,12-15,18-22	2.38	1.97	25.08	0.41	2.58	-11.3

Key: Budbreak = relative order of bud break, 1 is late bud break, 5 is earliest bud break.
Fruit/Vine (lbs.) converts approximately to tons per acre (at 605 vines/acre) by dividing by 3.
Pruning Weight = average pounds per vine.
50% Bud Kill = predicted temperature (ºF) at which 50% of primary buds would die according to freezing tests on dormant buds in mid-winter.
DM Ave. and PM Ave. = Average ratings of foliar downy and powdery mildew severity
Disease Rating System: 1 = 1-3% foliar infection, 2 = 3-12%, 3 = 12-25%, 4 = 25-50%, 5 = >50%.
Pruning weights from '19 and '20 crop years are incomplete

Table 2. Summary of vineyard characteristics of breeding selections grown with minimal fungicide applications. Reisch and Mansfield 2022 Report Appendix

Selections	Years of Harvest Data	PM	DM	Fruit wt./vine (lbs)	Fruit wt./vine (lbs in 2022)	Cluster wt (lbs)	Pruning Weight (lbs)	50% Bud Kill (ºF)
Reds								
06.0514.06	13-22	1.00	1.30	11.5	11.8	0.34	1.13	-15.2
06.0514.07	18-21	1.75	1.00	14.5	na	0.28	0.65	-16.7
07.0608.01	14,17-21	1.83	1.50	7.1	na	0.28	2.35	-20.1
08.0709.02	20-22	1.50	1.75	12.6	9.6	0.21	3.11	-16.9
10.0925.02	19-22	1.25	1.25	14.2	18.0	0.37	1.76	-17.2
10.0925.03	19-21	1.25	2.00	19.0	na	0.26	1.59	-13.8
12.0108.01	20-22	1.00	1.33	12.2	15.9	0.37	5.03	-12.4
Arandell	05-12,14,15,17	2.43	1.87	9.0	na	0.17	1.53	-12.0
Whites								
06.0506.02	13-15,17,19,21	1.00	1.14	5.7	na	0.27	1.30	-14.7
06.0508.02	17-21	1.00	1.33	9.2	na	0.31	3.41	-13.3
09.0815.01	19-22	1.75	1.50	17.7	25.5	0.30	1.13	-17.4
10.0927.01	20-22	1.33	1.67	13.8	17.4	0.33	2.07	-18.2
10.0927.02	20-22	1.00	1.33	4.7	4.3	0.26	1.82	-17.6
10.0928.01	22	1.00	1.80	3.4	3.4	0.16	2.09	-10.4
10.0934.01	19-22	1.25	1.50	13.6	21.5	0.35	1.96	-17.0
11.0010.01	20-22	1.67	1.67	10.3	16.4	0.16	2.37	-17.9
11.0013.01	21,22	2.00	3.00	13.0	12.1	0.15	2.59	
12.0107.01	20-22	1.33	1.33	7.9	11.1	0.34	1.23	-13.9
12.0107.03	21,22	1.50	1.50	4.9	4.7	0.29	1.40	-10.2
12.0112.01	21,22	1.00	1.50	14.9	17.0	0.27	3.02	-7.5
12.0114.01	21	1.33	1.33	7.1	na	0.17	4.39	
12.0118.01	21,22	1.67	2.00	10.8	15.0	0.27	1.37	-12.8
12.0118.02	21,22	1.50	1.50	11.9	11.9	0.34	3.49	-6.9
13.0205.01	21,22	2.00	1.50	12.2	12.5	0.13	3.67	-11.3
13.0205.02	20,22	1.33	1.67	7.1	9.8	0.24	3.24	-15.5
13.0206.02	21,22	1.00	2.00	8.9	13.9	0.16	3.05	-8.3

Fruit/Vine (lbs.) converts approximately to tons per acre (at 605 vines/acre) by dividing by 3.
Pruning Weight = average pounds per vine.
50% Bud Kill = predicted temperature (ºF) at which 50% of primary buds would die according to freezing tests on dormant buds in mid-winter.
DM Ave. and PM Ave. = Average ratings of foliar downy and powdery mildew severity
Disease Rating System: 1 = 1-3% foliar infection, 2 = 3-12%, 3 = 12-25%, 4 = 25-50%, 5 = >50%.
Pruning weights from '19 and '20 crop years are incomplete

Selection	Years of Harvest Data	Mean Harv. °Brix	Mean Harv. pH	Mean Harv. T.A. %	Mean Wine pH	Mean Wine T.A. %	Mean Wine Pleas. Score
Selections from Sprayed Vineyard							
Reds							
02.0101.01	10,12-16,18,19	19.6	3.05	1.00	3.13	0.94	4.83
08.0702.01	16-20,22	19.4	2.98	1.09	3.25	1.04	5.39
08.0702.02	16-20,22	20.0	2.74	2.04	2.71	2.04	4.03
08.0702.03	17,19,20,22	20.7	2.79	2.05	3.04	1.62	4.65
08.0710.01	16-22	21.3	2.94	1.21	3.17	1.08	3.68
10.0937.05	20,22	22.1	2.88	2.01	3.20	1.50	5.86
Chambourcin	97-02,06-22	20.3	2.99	1.32	3.19	1.06	5.32
Red Pressed as White (for Rosé)							
01.0609.01	09-15,17-19	18.5	3.14	0.99	3.23	1.10	5.35
Whites							
03.0207.06	12-21	19.4	2.93	1.33	2.90	1.36	5.17
03.0208.03	10-19	20.4	3.02	1.10	2.97	1.16	4.86
03.0208.09	11-18	20.2	2.91	1.10	2.86	1.26	4.99
04.0303.02	13-17,19	18.4	3.08	1.25	3.05	1.37	5.40
04.0303.04	13-16,18,19	19.8	3.09	0.94	3.17	1.03	5.54
05.0403.01	13-19	20.2	3.01	1.19	2.94	1.14	4.67
05.0403.03	13,14,17-19	20.3	3.08	0.95	3.09	1.01	4.35
05.0403.09	13-19	20.5	2.84	1.63	2.70	1.72	3.99
08.0721.02	18-22	19.3	3.00	1.06	3.03	1.17	4.67
08.0721.03	15,17-22	18.4	2.97	1.12	3.07	1.23	4.09
08.0722.01	17-21	18.9	3.03	1.22	3.07	1.29	5.36
08.0722.02	17,19	19.8	3.03	1.42	2.99	1.49	4.91
08.0726.01	20	20.0	2.76	1.81	2.86	1.77	3.91
Cayuga White	10,12-15,18-22	17.6	2.99	1.07	3.00	1.07	4.88

Selection	Years of Harvest Data	Mean Harv. °Brix	Mean Harv. pH	Mean Harv. T.A. %	Mean Wine pH	Mean Wine T.A. %	Mean Wine Pleas. Score
Selections from Disease Resistance Breeding Vineyard							
Reds							
06.0514.06	13-22	19.9	3.10	0.92	3.40	0.87	5.36
06.0514.07	18-21	19.8	2.88	1.32	3.20	1.21	4.83
07.0608.01	14,17-21	21.5	2.97	1.30	3.31	1.19	4.40
08.0709.02	20,21,22	19.5	2.87	1.66	3.11	1.34	5.15
10.0925.01	20	18.4	2.94	0.97	3.14	1.20	5.00
10.0925.02	19-22	18.8	3.01	1.01	3.32	1.17	5.55
10.0925.03	19,20,21	19.4	2.93	1.18	3.18	1.25	4.93
12.0108.01	20,21,22	18.0	3.03	1.18	3.50	0.94	4.50
Arandell	05-12,14,15,17	19.7	3.28	1.08	3.81	0.76	4.82
Whites							
06.0506.02	13-15,17,19,21	18.9	2.98	1.37	2.97	1.13	5.29
06.0508.02	17-21	19.4	3.02	0.98	3.07	0.92	4.78
06.0512.04	15,17,19, 20	19.4	2.91	1.13	2.89	1.23	4.41
06.0514.09	15,18,19	20.6	3.01	0.97	2.95	0.72	5.17
06.0514.12	15,17,19	19.0	2.84	1.54	2.82	1.53	4.41
09.0815.01	19-22	20.8	2.80	1.50	2.85	1.51	4.51
10.0927.01	20,21,22	19.7	2.96	1.27	3.09	1.30	6.05
10.0927.02	20,21,22	18.7	2.82	1.48	2.91	1.50	4.64
10.0928.01	22	21.1	2.93	1.07	2.93	1.16	
10.0934.01	19-22	20.2	2.86	1.32	2.96	1.38	4.49
10.0934.02	19,20	21.8	3.11	0.95	3.14	1.09	4.09
11.0010.01	20,21,22	20.3	2.83	1.44	2.95	1.55	5.83
11.0013.01	21,22	20.7	3.00	1.05	3.06	1.20	4.73
12.0107.01	20,21,22	19.2	2.72	1.58	2.77	1.65	4.14
12.0107.03 **	21,22	18.6	2.73	1.62	2.72	1.75	**
12.0112.01	21,22	19.8	3.05	0.72	3.12	0.95	6.40
12.0114.01	21	19.6	3.13	0.81	3.17	1.02	4.64
12.0118.01	21,22	19.8	2.92	1.19	3.01	1.31	5.13
12.0118.02	21,22	20.2	2.93	1.00	3.00	1.13	5.43

Selection	Years of Harvest Data	Mean Harv. °Brix	Mean Harv. pH	Mean Harv. T.A. %	Mean Wine pH	Mean Wine T.A. %	Mean Wine Pleas. Score
13.0205.01	21,22	17.8	2.78	0.98	2.95	1.18	5.07
13.0205.02	20,22	21.1	2.89	1.08	2.95	1.25	5.86
13.0206.01	20	21.9	2.96	1.04			(juice only)
13.0206.02	21,22	20.9	2.87	1.07	2.90	1.24	6.53

Note: Wine pleasantness is only available through 2021 harvest; 2022 wines not yet evaluated.
Scale: 1-10 with 10 = outstanding

All selections fermented for wine in 2019, 2020 and 2021 remain in this report (for completeness) since sensory place for these wines until September 2022.
Only the most promising selections from a viticultural and enological standpoint were continued for testing in 2022.
** 2021 wine not tasted due to lab error in acidity adjustment

‘ARAVELLE’, A HIGH-QUALITY BUNCH-ROT RESISTANT WHITE WINE GRAPE

Bruce Reisch[1], Anna Katharine Mansfield[1], Chris Gerling[1], Hans Walter-Peterson[2], Donald Caldwell[2] and Imed Dami[3]

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‘ARAVELLE’ is a white wine grape formerly known as NY81.0315.17, named and released in 2023. It resulted from a cross between ‘Cayuga White’ and ‘White Riesling’. Wine characteristics are similar to its ‘Riesling’ parent, but the resistance to bunch rot, downy mildew and powdery mildew are much improved over ‘Riesling’.

CLUSTER AND FRUIT CHARACTERISTICS

Clusters (0.25 lb.) are generally well-filled but can range from slightly loose to moderately compact. There are large numbers of brown spots (lenticels) on the amber 1.5 gm berries. Fruit usually ripen in late September in the Finger Lakes but can be harvested as late as mid-October with little concern for bunch rot.

VINE MANAGEMENT

Vines grown on their own roots are initially productive, but vine size declines over time. Grafting to a phylloxera-resistant rootstock is recommended. Own-rooted vines at Geneva and at Wooster averaged ~4 tons/acre (15 years), while vines grafted on C.3309 at Dresden, NY, averaged ~8 tons/acre (7 years). With its upright to semi-trailing growth habit, ‘Aravelle’ can be grown on a mid-wire spur-pruned cordon system with vertical shoot positioning and has also been successful on a high bilateral cordon. Other training systems are also suitable.

Cornell AgriTech
New York State Agricultural Experiment Station

LOW TEMPERATURE TOLERANCE

During 15 years at Geneva, dormant buds were tested for their ability to survive low temperature stress in mid-winter. They were estimated to have 50% bud survival at -13.5°F, better than 'Cayuga White' (-11°F). The date of budbreak in the spring is about the same as both of its parents. So, it does not differ from them in ability to avoid episodes of spring frost.

DISEASE RESISTANCE

Resistance to bunch rot is high, while resistance to powdery and downy mildews is moderate; better than 'Riesling' and similar to 'Cayuga White'.

FRUIT CHEMISTRY AND WINE CHARACTERISTICS

Over a 15-year period at Geneva freshly-pressed 'Aravelle' juice averaged 19.6°Brix, 11.3 g/L titratable acidity (TA), pH 2.99. At Wooster the averages were 20.7°Brix, 8.1 g/L TA, pH 3.10. Wines were consistently scored in the top tier in Geneva taste panels, often likened to monovarietal Riesling wines. Frequently cited descriptors included apricot, peach, honey, apple, floral, muscat, citrus, and tropical fruit. During a three-year trial of seven strains of yeast, tasters preferred the wines made with strain 71B.

AVAILABILITY: A US Plant Patent is pending. Vines are available for purchase from commercial nurseries. For a license to sell vines of 'Aravelle', please contact Cornell Technology Licensing, Albert Tsui <ayt28@cornell.edu>.