

Progress report, January 2022

SECTION 1

Project Title: Evaluation of Winegrape Cultivars and Clones on Long Island, 2021

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New Research Continued Research X

Amount Funded: \$23,593

SECTION 2

Summary Impact Statement: In 2021, 40 winegrape varieties were evaluated at the Long Island Horticultural Research and Extension Center in Riverhead. Vineyard data was presented to industry via several formats. This information assists growers in the selection of varieties, an important decision given the expense of planting (>\$20,000/acre) and the long-term nature of a vineyard. Planting varieties that perform poorly or are not suited to the winemaking goals of a business can be a costly mistake.

Objectives

1. Vineyard evaluation of the core varieties – Evaluation of 9 Chardonnay clones and 6 Merlot clones.
2. Evaluate new vinifera cultivars and clones – Explore 33 new and less common varieties.
3. Screen disease resistant hybrids - Evaluate degree of disease resistance and fruit quality in 5 hybrids.

Activities/Methods: In 2021, this vineyard consisted of 1.5 acres of vinifera and 0.15 acres of disease resistant hybrids. It is planted on a well-drained sandy loam soil. Vines are spaced 8x6 with VSP training and drip irrigation. Canopy management practices include shoot thinning to 4-5 shoots/ft. row, cluster zone leaf removal, crop adjustment and canopy hedging. Due to more than ample rainfall, drip irrigation was not necessary this season. In fact, shoot growth was excessive, requiring an extra pass with the canopy hedger. The area under vines was maintained with a tractor-mounted mower. Young vines were hand weeded and/or weeds were controlled with organic herbicide. Each vine was harvested individually to determine cluster number, crop weight per vine and average cluster weight. From each variety/clone, 100 berries were randomly sampled to obtain average berry weight, Brix, titratable acidity, pH.

Weather: There were 3677 GDD through October 31, similar to the last five years. The season was defined by warm temperatures, constant high humidity and dewy mornings. The rainfall total was average but included several multi-day deluges.

Planting: No new varieties were planted in 2021. Tannat, a red vinifera known for color, depth and tannin, was planted in 2020. Tannat is very popular in Uruguay. In 2019, Mencía, a well-regarded Spanish red vinifera known for a range of wine styles, and Rkatsiteli, an aromatic white vinifera from Georgia (Europe), were planted. A small crop was harvested from Rkatsiteli this harvest. Two hybrids of Tocai Friulano from the Italian VCR nursery were also planted in 2020. TF has good fruit quality but unacceptably low yields, 1-2 t/a. We hope to have sufficient fruit from these varieties for small lot winemaking in 2022 (fruit is given to local winemakers).

Herbicide damage: The vineyard suffered widespread injury due to dicamba drift from an adjacent property. Damage was the most severe (distorted leaves, stunted shoots, disrupted fruit set) on young vines and own-rooted vines. Several varieties such as Mencía, Grüner Veltliner, Chardonnay, Zweigelt and Merlot were more sensitive than others.

Pest management: Diseases were well controlled with the exception of downy mildew. Due to abundant rainfall and subsequent vigorous growth, DM was prevalent on lateral leaves and in the top of the VSP canopy. Saperavi was particularly susceptible. Hybrid vines were sprayed for phomopsis and black rot until fruit set. Itasca developed minor shoot phomopsis. After fruit set, the hybrids received two sprays for powdery and downy mildew. Most remained clean for the remainder of the season. However, NY81 developed extensive downy mildew in late August, resulting in substantial vine defoliation just after harvest in mid-September.

Harvest: Harvest was based on ripeness, fruit integrity and scheduling. *Botrytis* bunch rot (BBR) was virtually non-existent. Sour rot occurred in Pinot Noir, Zweigelt, Verdejo and Sangiovese. Varieties that typically struggle with sour rot, Aligoté, Sauvignon Blanc and Lemberger, were relatively clean. Fruit flies were common in early varieties such as Pinot Noir and Zweigelt but dwindled as harvest progressed. Yellow jackets were problematic through early October. NY81 suffered severe losses from yellow jackets, whole clusters were decimated by harvest on Sept. 20. For all but a handful of varieties, sugars were modest, mostly 19-21°. Acids were across the board lower than those in the hot, dry 2020 season. Cabernet Sauvignon had substantial bunch stem necrosis while Merlot and Saperavi had lesser amounts. BSN occurs in CS annually but is rarely this severe. Despite challenges, winemakers were generally pleased with fruit flavors and balance.

Results/Progress/Next Steps

Yield component results and brief descriptions of performance are included in attached files. Photos of all varieties were taken during the 2022 harvest. These are available upon request.

The installation of one acre of winegrapes ranges from \$20-30,000; consequently, a poorly performing variety can be a costly mistake. In a grower survey, 90% of respondents indicated they had used information from this vineyard in their planting decisions. This has included

plantings of Dijon Chardonnay clones, Albarino, Auxerrois, Malvasia, Muscat Ottonel and Verdejo. Disease resistant hybrids were successfully managed with <50% reduction in fungicide use. Several growers have expressed interest in planting hybrids.

Based on extensive discussions with the Grape Research Advisory Committee, the 2022 season will be the final season for the 1.5 a vinifera portion of this trial. The hybrid trial, currently 0.15 a, will be planted with four new selections in spring, 2022, bringing the total to 0.3 acres. Hybrids may well represent the future of viticulture in the eastern US due to their resistance to downy and powdery mildew. In the LIHREC vineyard, they are managed with less than half of the fungicides required for the vinifera. They are earlier ripening thereby reducing the risk of losing fruit to tropical storms in the fall. Hybrids are slowly being embraced in many wine regions of Europe. With breeding programs in Europe, the US and in fact at Cornell producing new, high quality selections, these merit evaluation to assess their suitability for use in eastern viticulture.

Technology Transfer Plan

A virtual presentation on this trial was given at BEV, March, 2021 (150 attendees). Articles on the trial will appear in the technical publications Long Island Fruit and Vegetable Update (circ. 220) and the January and February, 2022 issues of Suffolk County Agricultural News (circ. 330). A May, 2015, article on the trial appeared in the statewide newsletter Appellation Cornell (<https://grapesandwine.cals.cornell.edu/newsletters/appellation-cornell/>). The trial was repeatedly referenced in the statewide Veraison to Harvest newsletters (<https://grapesandwine.cals.cornell.edu/newsletters/veraison-harvest/>). Research reports are posted annually on our website - <http://ccesuffolk.org/grape-program>, >2200 hits in 2021. The annual LIHREC Plant Science Day, a vineyard tour/discussion and berry tasting, has not been held the past two seasons due to covid restrictions. For this reason, PowerPoint presentations summarizing the season's results have been posted on the CCE-SC grape program website. The presentation for 2021 season results was posted on line in January, 2022. Hopefully a field tour can be held in 2022.

Acknowledgements: Sincerest thanks to the Grape Research Advisory Committee and Long Island growers, whose continued support of this trial enables matching support generously provided by the New York Wine & Grape Foundation. This project was also supported by Cornell University's Federal Capacity Funds grant program. Many thanks to Double A Vineyards and Amberg Grapevines for donations of plant material and to Mudd Vineyards for donations of trellis supplies.

Evaluation of Winegrape Varieties and Clones, 2021: Yield component results

A.Wise, January, 2022

Chardonnay: Yields were high in 2021 due to the higher than average number of berries/cluster as well as large berries. Fruit had no *Botrytis* bunch rot and minimal sour rot at harvest, somewhat surprising given the season's rainfall. This vineyard received no botrycides.

Table 1. Yield components of Chardonnay clones by rootstock, LIHREC vineyard, 2021

Clone	Harvest Date	Clusters/vine			Crop weight, lbs./vine ²			Cluster wt., lbs./cluster			
		3309	101-14	Own	3309	101-14	Own	3309 2020	3309 2021	101-14 2021	Own 2021
5	Sept.29	16.8	16.4	15.8	8.4	8.1	8.0	0.43	0.50	0.49	0.51
15	Sept.28	20.3	22.9	19.9	6.6	6.3	4.5	0.30	0.33	0.28	0.23
17	Sept.29	21.5	19.4	14.8	6.8	6.9	4.1	0.27	0.31	0.35	0.27
75	"	19.0	▪	18.0	6.8	▪	7.2	0.26	0.36	▪	0.40
76	Sept.28	22.4	▪	▪	8.2	▪	▪	0.28	0.37	▪	▪
78	"	21.0	▪	21.0	7.5	▪	6.1	0.30	0.36	▪	0.29
95	"	20.3	▪	14.5	7.1	▪	4.3	0.28	0.35	▪	0.30
96	"	19.3	▪	18.5	8.4	▪	7.4	0.37	0.44	▪	0.40
GS ¹	"	▪	19.2	▪	▪	3.9	▪	▪	▪	0.21	▪

1 – GS (grower selection) vines are replicated on 101-14 rootstock only.

2 – 7 lbs/vine is equivalent to ~ 3.2 tons/acre.

3 – GS is grafted onto 101-14. ▪ Indicates vines not replicated on that rootstock.

Table 2. Yield components of Chardonnay clones by rootstock, LIHREC vineyard, 2021

Clone	Berries/cluster				Berry weight – grams			
	2020	2021			2020	2021		
	3309	3309	101-14	own	3309	3309	101-14	own
5	125.8	153.0	146.4	155.6	1.71	1.82	1.94	1.93
15	93.6	117.4	103.0	86.7	1.73	1.74	1.60	1.56
17	76.9	108.6	112.4	87.3	1.84	1.71	1.63	1.71
75	87.2	▪	▪	▪	1.53	▪	▪	▪
76	81.0	▪	▪	▪	1.74	▪	▪	▪
78	97.4	▪	▪	▪	1.68	▪	▪	▪
95	92.0	▪	▪	▪	1.88	▪	▪	▪
96	97.7	130.0	▪	122.4	1.81	1.75	▪	1.63
GS ¹	78.7	▪	▪	▪	1.52	▪	▪	▪

1 – GS vines are replicated on 101-14 rootstock only. ▪ Indicates vines not replicated on that rootstock or data not collected.

Table 3. Fruit ripening, Chardonnay clones /3309, LIHREC vineyard, 2020-2021

Clone	°Brix		TA, g/l		pH	
	2020	2021	2020	2021	2020	2021
5	22.3	20.0	10.8	6.75	3.13	3.22
15	22.5	20.7	7.35	6.75	3.16	3.40
17	22.3	19.8	8.25	6.30	3.23	3.38
75	21.3	▪	7.5	▪	3.16	▪
76	21.7	▪	7.65	▪	3.13	▪
78	21.4	▪	7.35	▪	3.14	▪
95	21.8	▪	7.2	▪	3.16	▪
96	21.4	19.9	7.5	5.1	3.15	3.56
GS ¹	21.3	▪	6.45	▪	3.18	▪

1 – GS vines are replicated on 101-14 rootstock only. ▪ Indicates vines not replicated on that rootstock or data not collected.

White varieties other than Chardonnay: At harvest, minimal field cleaning was necessary with Grüner and Verdejo the exception. Both had Cluster weight was above average in 2021 due good berry set and large berries. During field tours in past years, growers were most impressed with flavors of Verdejo, Vermentino and Albariño. Rkatsiteli also received good reviews. Vermentino had the largest berries this season, averaging 4 g/berry.

Table 4. Performance of white winegrape varieties, LIHREC vineyard, 2021

Variety	Harvest date	Clust. no./vine	Crop wt. lbs./vine	Cluster wt. lbs./clust.	Berries/ cluster	Berry wt.- g.	°Brix	TA, g/l	pH
Albariño/14 ¹	Sept.21	21.9	6.5	0.30	122.2	1.41	19.8	8.4	3.28
Aligoté 1/09	Sept.20	21.8	11.7	0.54	148.8	1.98	18.6	6.9	3.12
Arneis/14	Sept.22	13.5	7.3	0.55	152.1	1.81	19.0	5.7	3.34
Auxerrois 45/14	Sept.14	22.3	10.0	0.45	116.8	1.96	19.4	6.0	3.29
Gewürz 1/09	“	19.3	3.6	0.18	68.8	1.68	19.6	4.95	3.80
Gewürz 3/09	“	19.5	5.2	0.27	76.2	1.75	19.5	5.4	3.74
Grüner Veltliner/14	Sept.14	23.5	8.0	0.35	120.0	2.03	19.2	7.2	3.23
Itasca/own	Sept.3	29.5	4.8	0.16	71.9	1.33	23.6	8.4	3.08
Malvasia Bianca/09	Sept.15	10.5	9.3	0.87	128.0	3.26	18.5	7.5	3.15

Table 4, continued. Performance of white winegrape varieties, LIHREC vineyard, 2021

Variety	Harvest date	Clust. no./vine	Crop wt. lbs./vine	Cluster wt. lbs./clust.	Berries/cluster	Berry wt.- g.	°Brix	TA, g/l	pH
Moscato Giallo/09	Sept.15	12.1	9.1	0.74	147.0	2.63	18.0	8.4	3.16
Muscat Ottonel 1/09	Sept.14	23.3	8.3	0.36	61.0	2.87	18.8	5.1	3.39
NY 81 /09 ²	Sept.20	18.7	7.9	0.42	122.8	1.81	21.5	8.1	3.12
Petit Manseng/14	Oct.20	17.0	6.2	0.36	163.5	1.30	24.2	10.5	2.86
Pinot Gris 146/09	Sept.14	18.5	6.1	0.33	107.2	1.41	19.7	5.4	3.47
Pinot Gris 152/09	“	19.3	5.8	0.30	102.9	1.56	19.6	5.7	3.33
Rkatsiteli/09	Sept.29	6.9	4.1	0.59	121.6	2.63	18.8	5.4	3.00
Sauv.Blanc 1/09	Sept.21	23.7	9.6	0.41	124.9	1.82	20.3	6.9	3.19
Sauv.Blanc 376/14	“	24.7	8.9	0.36	122.2	1.80	19.4	6.3	3.34
Sauv.Blanc 530/14	“	25.3	8.5	0.34	115.0	1.57	19.7	6.0	3.23
Semillon 2/09	“	16.8	8.5	0.51	127.0	2.17	19.1	6.3	3.05
Semillon 3/09	“	16.8	7.7	0.45	104.1	2.56	18.5	5.1	3.36
Tocai Friulano 1/14	“	19.2	5.7	0.29	93.1	1.75	19.2	6.1	3.49
Verdejo/09	Sept.14	16.0	8.7	0.55	138.8	2.26	19.0	7.2	3.19
Vermentino/5BB	Sept.29	16.3	10.8	0.68	103.9	4.00	18.8	7.35	3.24

1 – Leaf roll infected vines. 2 – Riesling x Cayuga White hybrid. 7 lbs/vine = ~3.2 tons/a.

Merlot: Berries/cluster were above average in 2021 though interestingly berry size was lower than in 2020. This was possibly a consequence of herbicide damage as many Merlot clones had foliar symptoms as well as a portion of clusters with extremely poor set (thinned off as ripening was irregular). Clones 1 & 3 are widely planted and are consistently good performers in yield and quality. Clone 6 consistently requires heavy cluster thinning. If high production is the goal, clone 6 is a good choice. Many growers like the fruit quality of clone 181. Clones 181 and 314 have large clusters and require careful thinning.

Table 5. Yield components of Merlot clones by rootstock, LIHREC vineyard, 2021

Clone	Harvest date	Clusters/vine			Crop weight, lbs./vine			Cluster wt., lbs./cluster			
		3309	101-14	Own	3309	101-14	Own	3309 2020	3309 2021	101-14 2021	Own 2021
1	Oct.19	14.6	15.1	12.4	7.4	6.6	5.4	0.48	0.51	0.44	0.43
3	"	14.5	13.2	14.0	7.4	6.9	6.5	0.49	0.51	0.52	0.47
6	"	13.9	▪	▪	7.1	▪	▪	0.48	0.51	▪	▪
8	"	15.4	16.2	17.3	6.1	5.5	5.0	0.39	0.40	0.35	0.29
181	"	13.3	▪	▪	8.0	▪	▪	0.55	0.61	▪	▪
314	"	10.6	▪	▪	6.4	▪	▪	0.57	0.61	▪	▪

▪ Indicates vines not replicated on that rootstock. 7 lbs/vine is equivalent to ~ 3.2 tons/acre.

Table 6. Yield components of Merlot clones by rootstock, LIHREC vineyard, 2020-21

Clone	Berries/cluster				Berry weight – grams			
	2020	2021	2021	2021	2020	2021	2021	2021
	3309	3309	101-14	Own	3309	3309	101-14	own
1	135.8	147.3	▪	▪	2.08	1.97	▪	▪
3	114.2	143.3	138.2	135.3	2.05	2.03	1.75	1.93
6	119.2	146.3	▪	▪	2.01	1.90	▪	▪
8	94.4	127.0			2.16	1.86	▪	▪
181	145.8	164.7	▪	▪	2.13	1.97	▪	▪
314	159.6	160.3	▪	▪	2.03	1.91	▪	▪

▪ Indicates vines not replicated on that rootstock or data not collected. 7 lbs/vine is equivalent to ~ 3.2 tons/acre.

Table 7. Fruit ripening, Merlot clones/C3309, LIHREC vineyard, 2020-2021

Clone	°Brix		TA, g/l		pH	
	2020	2021	2020	2021	2020	2021
1	21.9	19.8	5.55	4.80	3.38	3.72
3	22.2	19.8	5.40	5.10	3.36	3.69
6	22.3	19.9	5.55	5.25	3.40	3.55
8	22.8	20.3	5.40	5.10	3.49	3.78
181	22.9	19.9	4.80	4.80	3.37	3.63
314	22.8	20.0	5.10	4.80	3.28	3.57

Red varieties other than Merlot: In 2021, the performance of varieties varied. Many had above average set and berry size. A few, notably Malbec, did poorly this season. This is likely due to a combination of herbicide damage and Malbec's generally finicky

nature. Dornfelder fruit deteriorated rapidly in mid-September, uncharacteristic for that variety. Pinot Noir and Zweigelt, the earliest red vinifera, suffered from extensive sour rot as they do every year. Some Zweigelt vines lost their crop due to unusual post-veraison berry shriveling and cessation of ripening. This has never occurred in prior years. Circumstantial evidence suggests it occurred due to the extensive foliar herbicide damage. Photos available upon request.

Newer reds include Saperavi and the hybrid Regent. Saperavi vines, planted in 2015, have performed erratically. There have been difficulties with trellis fill, leaf reddening post-veraison (virus tests have been negative) and stem necrosis at harvest. Saperavi had sour rot at harvest though less than what was seen in Pinot Noir or Zweigelt. Despite these challenges, Saperavi fruit is bold and flavorful and has good wine quality potential. Regent, planted in 2017, is a cross with Chambourcin, Müller-Thurgau and Silvaner parentage. It is widely planted in Germany. Regent is purportedly winter-sensitive thus limiting its appeal for some eastern regions. Vines have thrived with a reduced fungicide schedule. The 28 vines had just a couple of downy mildew spots in September.

Table 8. Performance of red winegrape varieties, LIHREC vineyard, 2021

Variety/clone	Harvest date	Clust./vine	Crop wt. lbs./vine	Clust.wt. lbs./clust	Berries /clust.	Berry wt.-g.	°Brix	TA, g/l	pH
Barbera 2/09	Oct.18	15.2	10.25	0.66	109.0	3.24	22.3	10.05	3.09
Cab.Franc 1/09	"	17.6	7.5	0.42	125.7	1.96	21.2	5.55	3.62
Cab.Franc 332/09	"	18.3	7.6	0.42	149.2	1.95	20.5	5.4	3.64
Cab.Sauv.7/09	Oct.25	20.1	6.1	0.31	111.3	1.72	19.4	5.7	3.43
Cab.Sauv.8/14	"	19.3	5.3	0.28	117.5	1.69	19.4	6.6	3.46
Cab.Sauv.11/09	"	17.0	4.8	0.29	97.5	1.60	19.1	6.15	3.40
Cab.Sauv.21/09	"	18.0	5.1	0.30	98.1	1.63	19.6	6.3	3.47
Dornfelder/09	Sept.14	15.5	9.0	0.58	93.8	2.60	18.5	6.45	3.37
Lemberger/09	Oct.1	15.1	8.2	0.54	128.5	2.35	19.4	5.55	3.31
Malbec 4/09	Oct.18	31.8	7.6	0.26	56.1	2.05	19.0	5.7	3.34
Malbec 6/09	"	34.0	6.5	0.19	53.1	2.34	20.6	6.6	3.46

Table 8, continued. Performance of red winegrape varieties, LIHREC vineyard, 2021

Petit Verdot 2/09	Oct.25	25.0	6.3	0.25	128.2	1.10	23.5	8.25	3.24
Pinot Noir 4/09	Sept.8	15.3	4.7	0.31	113.2	1.50	19.1	6.15	3.12
Regent/14	Oct.6	14.2	5.9	0.42	86.6	2.34	23.5	6.45	3.34
Sangiovese2/09	Oct.18	14.0	12.8	0.91	172.6	2.67	19.8	6.45	3.38
Saperavi/09	Sept.21	16.5	9.2	0.57	160.9	2.32	19.8	9.0	3.30
Syrah 1/09	Oct.18	18.1	7.1	0.39	112.9	1.94	19.0	6.3	3.54
Syrah 3/09	"	19.3	6.5	0.34	▪	▪	▪	▪	▪
Zweigelt/14	Sept.15	13.9	8.6	0.62	166.4	2.09	19.3	7.05	3.17

7 lbs/vine is equivalent to ~ 3.2 tons/acre. ▪ - Indicates data not collected.