Veraison to Harvest

Statewide Vineyard Crop Development Update #6

October 7, 2011

Cornell University Cooperative Extension

Edited by Tim Martinson and Chris Gerling

Around New York…

Statewide *(Tim Martinson)*.

Continued cloudiness, cool highs (50s and low 60s) and rain earlier in the week gave way to sunshine, warmer days (60s and 70s) and cooler nights (mid 30s, scattered frost in low lying areas) late in the week. The forecast for continued sunshine and heat (during the day, cool at night) is good news for late-season reds. As I've collected berry samples from different Riesling vineyards this week, I've noticed a lot of significant differences in botrytis related to both management and overall vine size. Sites with shallower soils (and therefore smaller vines) had more open canopies and smaller berries. One grower who did a late-season (August) leaf removal (close to 100% in fruiting zone) had very low levels of botrytis. In a foliar N fertilization experiment (see article) we found dramatic differences in botrytis levels related to nitrogen fertilization – especially with multiple foliar sprays.

Fruit maturity (table pp 4-6) advanced moderately this week, with later varieties (Cabernet franc, Merlot, Catawba) gaining 0.5 °Brix, and TAs dropping by 0.5 g/l. Varieties closer to harvest (Chardonnay, Traminette, Lemberger, Riesling, Noiret) showed smaller changes – most were either harvested this week, or slated for harvest by next week.

Long Island (*Alice Wise and Libby Tarleton*).

We endured 10.6" of rain in August, 7" in September, a 12 hr tropical storm in late August, and a month of predominantly cloudy, damp days. The fact that quality fruit was harvested under these growing conditions is a testament to the skills of vineyard managers and dedication of their crews. The warm, dry summer also helped; we just hit 3300 GDD in Riverhead, which is about average for the last decade. But considering the cooler temperatures in September and thus far in October, this means the spring and summer were warmer than the long term average. Finally we are in a stretch of beautiful sunny, albeit still somewhat cool weather with daytime highs in the upper 60's and nights in the 50's. Harvest continued this past week for Chardonnay and other whites as well as early reds for rose wines. The weekend is forecasted to be sunny and in the mid to upper 70s. This will provide a much needed nudge to red grapes as they progress in ripening. Bird and wildlife pressure appears to be spotty, with some blocks under siege while others have little or no pressure.

Frontenac Gris (top) and Louis Swenson (bottom) at the Willsboro cold-hardy variety planting on Lake Champlain. Kevin Iungerman and a crew of volunteers are harvesting the last of the 20 varieties this weekend. These are trained to top-wire cordon, with shoots thinned and combed downward to increase fruit exposure.

Photo by Kevin Iungerman

Lake Erie (*Jodi Creasap Gee*).

We are officially in the middle of Concord harvest now that Cott/Cliffstar opened on the morning of Oct. 04. Those growers are happy to be picking and delivering fruit to another processer. Shelling has been a concern for the past week; Concord berries are falling from clusters with just a slight shake to the canopies, so everyone is trying to get fruit in as quickly as possible. National Grape reported bringing in just under 30,000 tons between the Westfield and North East plants since Sept. 26, and so far they

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continue to be pleased with the quality of the fruit coming in – just over 16 Brix average at both plants.

Wine grapes continue to be picked as well, especially now that rots have moved into vineyards. Split berries are now covered in botrytis and other opportunistic fungi, reducing the quality of portions of vineyards. Growers are working with wine makers to try to get fruit picked to stay ahead of the disease, while others are hopping these next few sunny days will dry things out a little.

The rain has created muddy vineyards, which, in turn, has created maneuverability challenges for harvesters, tractors, trailers, and extension associates' cars in some vineyards and loading areas. None of this weather seems to have stopped anyone, though, and truckloads of grapes continue to move along Route 20 regularly.

Niagara County reports lower sugars – in Concords and Niagaras – than what has been reported around the lower end of the belt. The Niagara crop in Niagara County is still being picked and shipped to Pleasant Valley for National Grape, and tonnages vary. Brix are anywhere from 13-15, with 13.8 Brix being the average for the Niagaras brought into Pleasant Valley at this point, as reported by National Grape in their weekly newsletter.

Finger Lakes (Hans Walter-Peterson)

Panic briefly ensued in the Finger Lakes earlier this week after residents noticed a large, bright orb in the sky that made the people have to squint or avert their eyes altogether, lest they be blinded. And then we remembered what the sun actually looked like...

The return of a prolonged stretch of dry, sunny weather is a welcome relief to growers who have spent much of the past few weeks picking fruit in less than desirable conditions. Two inches or more of rain fell in the last week of September and early October in the Finger Lakes, which only helped to continue the wet conditions that have been promoting botrytis development in many vineyards, and making harvest a bit more of a sloppy operation that usual. The dry conditions should help fruit that has managed to stay relatively clean to this point to avoid flair ups of new bunch rot infections for at least a little while.

We are starting to see the beginning of a major push to harvest Riesling blocks this week. Early indications are that brix are still lower than normal (see results from our samples this week), but acidity is generally in the range that we like to see at harvest. Yields appear to be healthy as well - we harvested a trial today at a Riesling vineyard on the west side of Seneca that we estimated is carrying about 6.5 - 7.0 tons/acre. It's likely that a lot of fruit that is on the verge of succumbing to more significant amounts of bunch rot will be picked at the end of this week and the beginning of next after it's been given a little more time to dehydrate and concentrate flavors.

Hudson Valley (*Steven McKay & Steve Hoying)*.

Wet, cool weather has continued to prevail in the Hudson Valley for the past week. Drier weather with warmer days is predicted for the weekend. It is hoped that brix readings may rise without having added problems with additional rot developing. Most vineyards were hard pressed to see even a degree rise in brix this week. Quality of foliage is not as good as in past years, and vines seem to be a bit slower in hardening off this year. The first frosts are predicted for Thursday in the early hours.

Sour rot damage has been extensive in the Hudson Valley this season and coupled with split berries and the insects that follow, clusters in many sites seem to "melt" off the vine as they ripen. Whitestone Vineyard is hoping to harvest Noiret next week, and the last variety they have hanging is Cabernet Franc. At theHudson Valley Lab, Sauvignon Blanc and Traminette are in line to be picked next.

Ranking the Acids: pH, TA and the Role of Malic Acid

Chris Gerling and Gavin Sacks

Editor's note: Conditions over the past month have been highly favorable for botrytis and associated rot. I wrote about some of the chemical transformations related to botrytis previously here: http://grapesandwine.cals.cornell.edu/cals/grapesandwine/veraison-to-harvest/upload/veraison-to-harvest-2008_6.pdf.

In the above article I mentioned two issues that are not necessarily the first ones that come to mind when we think of botrytis. Tim Martinson has collected some preliminary data on the effect of nitrogen fertilization on botrytis rates in the vineyard. I'll be talking about two ways botrytis can contribute to higher levels of malic acid in the cellar and the problems that can occur. If you need a primer on pH and TA, click here: http://www.fruit.cornell.edu/shared/pdfs/ManagingAcid.pdf *-CG*

Grape ripening, and the associated decrease in titratable acidity (TA)/ increase in pH, is basically a decrease in the amount of malic acid in the grapes. If the ripening process is cut short because of rot (hypothetically), more malic acid

is retained. Tartaric acid is mainly fixed once it has accumulated, and the amount will not change very much thereafter under normal conditions. Under abnormal conditions such as botrytis (abnormal in most years, that is), tartaric may actually be degraded. Either of the above scenarios- early harvest or excessive botrytis- can mean lots of malic acid (or lots by proportion), and lots of malic acid is often trouble. Here's our attempt to explain why tartaric is great, lactic is acceptable, and malic is better off staying in cider.

We need acid in wine for a few reasons, but the major two (along with the corresponding measure) are: 1.) Sourness to balance flavor (TA) and 2.) Microbial stabilization (pH). Without enough acid the wine will be flabby and risk spoilage, but too much acid can lead to harshness and an inability for tasters to perceive much of anything else. Accepting that there is some wiggle-room and every variety and wine style is different, we know that the most severe problems stem from either the pH or the TA being too high. This situation can be difficult to avoid when you think about it, however, because if you put in a lot of acid, the TA is going to climb, but if you don't have enough, the pH will rise. Connecting the dots, the ideal acid is a strong acid that can move the pH down most in the smallest amount.

Why is malic acid "worse" than other acids? Because it doesn't help us achieve our often conflicting goals. Tartaric acid and malic acid are diprotic, meaning that they contain two hydrogen ions in each molecule. They contribute to the TA more than monoprotic acids like lactic and acetic acid. Tartaric is "better," however, because it's a stronger acid, and an equivalent amount will keep the pH lower. So then why is lactic acid still preferable to malic, if malic is stronger than lactic? Lactic, being monoprotic, doesn't count against the TA as much as malic, and leaves space for an addition of tartaric (if necessary). A combination of lactic and tartaric will yield a lower pH at the same TA than if the malic acid was just left alone.

Imagine that spoilage organisms are behind a door, and you have a box that you've placed against the door to keep it shut. The box has to be heavy enough to keep the door closed, but it also has to be fairly small. The door is next to where people tasting the wine will be walking, and if the box gets too big people will trip on the box and blame you. The box is filled with acid blocks. Tartaric acid blocks are fairly large, but also very heavy, so they do the job nicely. Malic blocks are also big, but they are not as heavy as tartaric. With too much malic, the box can't be both small and heavy. The malic blocks can be broken in half to make lactic blocks, however, and while these are lighter still, they are now small enough that they can be arranged to take up less space. This additional space allows for a couple more tartaric blocks that make the box heavier than if it was just filled with malic blocks.

When we looked at 17 wines that did not undergo MLF but were chemically adjusted to the same TA, we found that malic acid is better at predicting their final pH than tartaric acid or even the initial pH (**Figure 1)**. Malic acid content is determining the fate of these wines, at least pH-wise, and dictating that in some high malic situations a manageable pH/TA combination will be difficult or impossible to achieve. This is all another way of saying that high malic is a problem, and not necessarily a problem for which there are easy solutions. In Cellar Dweller issues to come we will talk about double-salt deacidification (double-salt rule #1: there is no double-salt) and more about this issue. But for now, may all your grapes be flavorful and all your acid be tartaric.

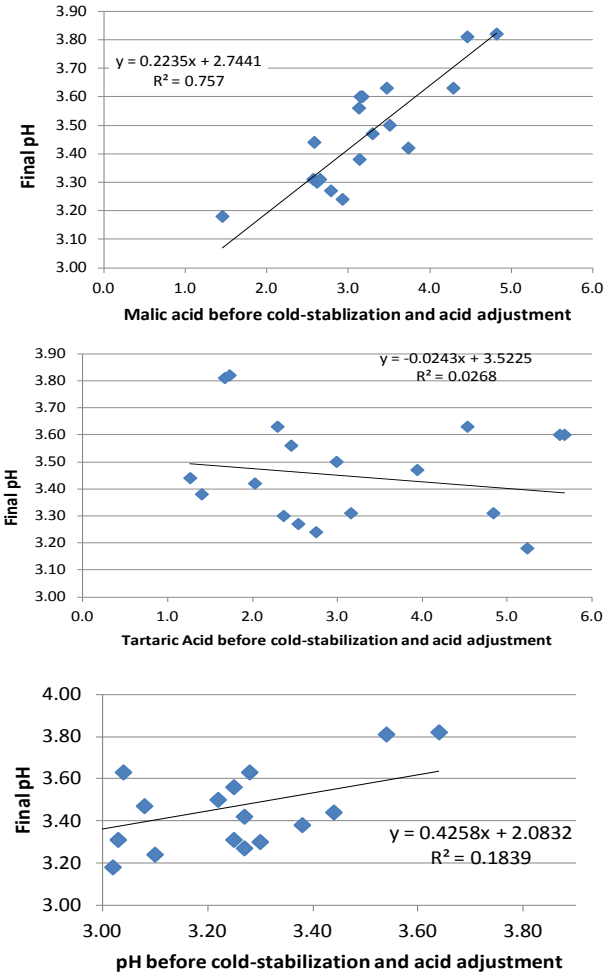

Figure 1: *17 wines in study were adjusted to TA of 7-8 g/L. No ML was performed. Plots of Final pH vs. wine parameters before cold stabilization an acid adjustments are shown. Compare the relation between malic (top) and tartaric (bottom) and final pH. In brief, malic acid concentration is a good predictor of final pH.*

Project Focus: Foliar Nitrogen Sprays Increase YAN and Botrytis in Riesling

Tim Martinson, Mark Nisbet, Wayne Wilcox, and Lailiang Cheng

This year we set up a trial in a Seneca Lake Riesling vineyard to measure the effect of soil and foliar nitrogen applications on Yeast Assimilable Nitrogen (YAN) levels in fruit – foliar-applied nitrogen being one way we suspected growers could increase low levels of N. An unexpected side benefit, was that we also had a great year to test their effect on *Botrytis* levels in the fruit. Six inches of rain in September provided an ideal backdrop. And results were dramatic.

Treatments. We had 10 different treatments, with various combinations of soil N (30 lb/acre actual N, applied post-bloom) and different numbers of foliar urea sprays (5 lb actual N or 10 lb urea in 100 gal/acre of water) applied starting 2 wk before veraison and at weekly intervals spanning the next 5 weeks.

1. How treatments affected YAN. We collected fruit samples on September 23 and October 3, and tested for YAN. Here is what we found:

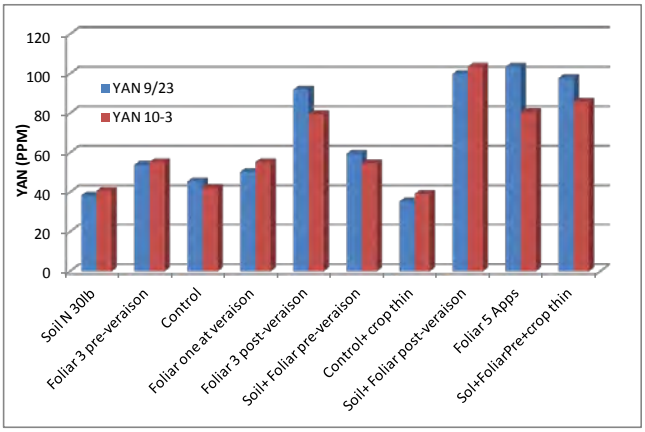

Figure 1. *Yeast Assimilable Nitrogen in Riesling on 9/23 and 10/4 as affected by different foliar and soil N applications and cluster thinning.*

- The treatment labeled 'Control' represents the base level of YAN in the vineyard. It was 40 PPM (very low, but in the range we are finding in Riesling this year).
- Soil N alone did not increase YAN. Neither did cluster thinning (we dropped about 2/3 of the clusters in the 'crop thin' treatments).
- Pre-veraison (3 applications stopping at veraison) N, with or without the soil N application, increased YAN slightly – from about 40 to 50 ppm.

Different levels of botrytis - from none (top left) to >90% (bottom right) at the YAN experiment on October 3. Twenty clusters were examined and the % botrytis in each cluster was rated to determine average botrytis severity.

- Post-veraison foliar applications (3 starting at veraison), with or without soil N, increased the YAN to 80-100 ppm. Still low – but double the base level. Interestingly the 'soil plus 3 preveraison plus crop thin' treatment also increased YAN where either alone had little effect.

2. How treatments affected *Botrytis* severity Early this week, I rated botrytis severity (see photo) in all the 40 plots (10 treatments x 4 replicates). Following instructions from plant pathologist Wayne Wilcox, I selected 20 clusters and estimated the percentage of each cluster with *botrytis*. Results were dramatic:

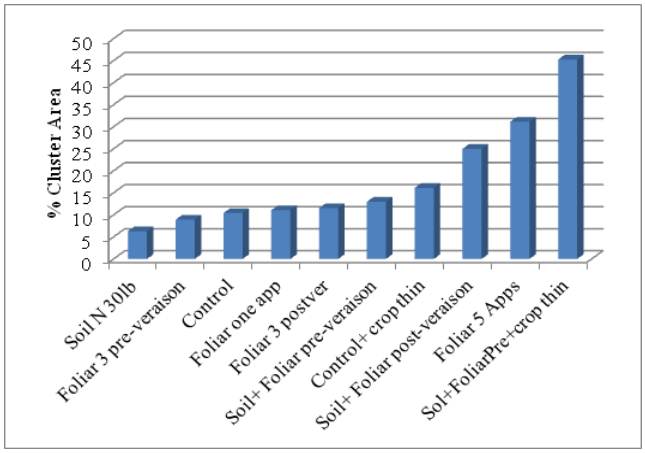

Figure 2. *Percent botrytis infection in Riesling on 10/3 as affected by different foliar and soil N applications and cluster thinning.*

- *Botrytis* severity (% of cluster area affected) ranged from about 8% in the untreated control to 45% in the soil + 3 foliar pre-veraison applications + crop thinning treatment – a 5-fold increase in *botrytis.*
- Soil + 3 foliar post-veraison sprays and 5 foliar N applications also increased *botrytis* severity to 25 and 30%, respectively.

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Fruit Maturation Report - 10/7/2011

Samples reported here were collected on **Monday, October 3.** Please note: Previous sample averages reflect **only** samples from the limited set we sampled last week. Where appropriate, sample data from 2010, averaged over all sites is included. Tables from 2010 are archived at http://grapesandwine.cals.cornell.edu/cals/grapesandwine/veraison-to-harvest/2010.cfm .

We are again reporting berry weight, brix, titratable acidity and pH, and yeast assimilable nitrogen (YAN), as part of a joint project with Anna Katharine Mansfield and Lailiang Cheng. Graduate student Mark Nisbit is running the YAN assays as part of his Ph D project, and other students from the Enology lab are running samples. - TEM

Cabernet Franc

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Finger Lakes	10/3/2011	W Seneca	1.41	20.8	3.16	6.9	23
Finger Lakes	10/3/2011	W Cayuga	1.88	20.1	3.42	5.5	70
Hudson Valley	10/3/2011	HV Lab	1.58	17.4	3.71	5.6	176
Lake Erie	10/4/2011	Portland	2.07	19.1	3.18	10.2	143
Average	10/4/2011		1.74	19.4	3.37	7.1	103
Prev Sample	9/27/2011		1.59	18.8	3.29	7.5	100
'10 Average	10/4/2010		1.56	22.1	3.61	6.1	63

Catawba

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Finger Lakes	10/3/2011	W Cayuga	2.60	18.2	3.02	10.3	92
Prev Sample	9/27/2011	W Cayuga	2.45	17.8	2.89	11.3	54
'10 Sample	10/4/2010	W Cayuga	2.71	16.1	3.29	5.1	203

Cayuga White

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Finger Lakes	9/20/2011	W Keuka	HARVEST				
Finger Lakes	9/20/2011	W Cayuga	HARVEST				
Final Sample	9/20/2011		2.55	16.5	3.12	8.3	168
'10 Sample	8/30/10	Final sample	2.91	15.4	3.3	12.1	201

Chardonnay

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Finger Lakes	10/3/2011	W Seneca	1.51	21.2	3.34	6.4	64
Finger Lakes	10/3/2011	W Cayuga					
Hudson Valley	10/3/2011	HVL	1.53	17.5	3.79	6.7	322
Hudson Valley	10/3/2011	Hudson Valley	1.60	19.6	3.55	5.9	238
Long Island	10/3/2011	North Fork South	1.96	18.7	3.57	7.7	201
Average	10/3/2011		1.65	19.3	3.56	6.7	206
Prev Sample	9/27/2011		1.64	19.0	3.45	7.3	236
'10 Average	9/13/2010	Final sample	1.42	21.6	3.59	6.8	246

Chenin blanc

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Long Island	9/28/2011	North Fork North	HARVEST				
Final Sample	9/28/2011	North Fork North	2.20	15.2	3.20	10.0	93

Concord

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Finger Lakes	10/3/2011	W Keuka	3.25	16.4	3.29	7.8	174
Lake Erie	10/3/2011	Portland	3.56	18.3	3.39	7.9	224
Average	10/3/2011		3.41	17.4	3.34	7.9	199
Prev Sample	9/27/2011		3.13	17.0	3.30	9.0	222
'10 Sample	10/4/2010		3.22	17.1	3.61	6.6	157

Lemberger

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Finger Lakes	10/3/2011	E Keuka	1.56	21.7	3.21	5.9	14
Finger Lakes	10/3/2011	W Seneca	1.70	19.9	3.33	5.4	143
Average	10/3/2011		1.63	20.8	3.27	5.7	79
Final Sample	9/27/2011		1.52	21.1	3.21	6.3	71
'10 Sample	10/4/2010		2.30	21,8	3.,35	7.6	70

Malbec

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Long Island	10/3/2011	North Fork South	2.18	18.7	3.89	7.2	278
Prev Sample	9/20/2011	North Fork South	2.18	17.9	3.50	9.3	282

Merlot

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Hudson Valley	10/3/2011	HV Lab	1.58	16.3	3.80	5.7	221
Long Island	10/3/2011	North Fork South	1.86	18.1	3.81	6.3	159
Average	10/3/2011		1.72	17.2	3.81	6.0	190
Prev Sample	9/27/2011		1.81	17.0	3.66	7.1	187
'10 Sample	10/4/2010		1.76	20.8	3.85	5.0	128

Niagara

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Lake Erie			HARVEST				
Final Sample	9/20/2011	Portland	4.40	16.0	3.21	7.9	172

Noiret

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Hudson Valley	10/3/2011	HV Lab	1.72	17.0	3.57	7.0	284
Hudson Valley	10/3/2011	W HV	1.71	17.7	3.30	8.4	139
Lake Erie	10/3/2011	Ripley	2.48	19.4	3.25	7.7	184
Average	10/3/2011		1.97	18.0	3.37	7.7	202
Prev Sample	9/27/2011		1.69	17.9	3.27	8.3	201
'10 Average	10/4/2010		1.85	19.6	3.6	6.1	111

Pinot Noir

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Finger Lakes	10/3/2011	E Seneca					
Hudson Valley	10/3/2011	HV Lab	Harvest				
Hudson Valley	10/3/2011	Hudson Valley	1.43	20.0	3.85	9.5	356
Average		No average calculated					
Prev Sample	9/27/2011		1.72	18.7	3.68	7.6	311
'10 Average	9/20/2010	Final Sample	1.44	23.6	3.95	7.0	266

Riesling

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Finger Lakes	10/3/2011	E Seneca	1.58	17.5	3.06	8.0	22
Finger Lakes	10/3/2011	E Seneca	1.63	18.3	3.01	8.0	50
Finger Lakes	10/3/2011	W Seneca - LR/ST	1.38	19.2	3.07	8.0	14
Finger Lakes	10/3/2011	W Seneca - NLR/NST	1.38	19.6	3.04	7.9	31
Finger Lakes	10/3/2011	E Seneca-shoot thin	1.61	18.9	3.04	8.3	27
Finger Lakes	10/3/2011	E Seneca - no thin	1.58	16.7	2.99	8.8	29
Finger Lakes	10/3/2011	W Cayuga	1.73	18.4	3.04	8.5	92
Hudson Valley	10/3/2011	HV Lab	1.71	14.2	3.47	8.6	196
Lake Erie	10/3/2011	Fredonia	2.57	16.5	3.11	9.9	241
Long Island	10/3/2011	North Fork North	HARVEST				
Average	10/3/2011		1.69	17.7	3.09	8.4	78
Prev Sample	9/27/2011		1.55	17.8	3.19	8.9	132
'10 Average	10/4/2010		1.57	18.6	3.29	8.3	98

Sauvignon Blanc

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Long Island			HARVEST				
Final Sample	9/20/2011	North Fork North	1.64	18.7	3.44	7.1	170
'10 Sample	9/08/2010	Final Sample	1.84	19.8	3.64	8.0	242

Seyval Blanc

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Finger Lakes	9/13/2011	W Cayuga	HARVEST				
Hudson Valley	9/26/2011	Hudson Valley Lab	HARVEST				
Hudson Valley	9/13/2011	W HV	HARVEST				
Average							
Prev Sample	9/20/2011	(only 1 block)	1.76	18.4	3.29	7.2	136
'10 Average	8/30/2010	Final Sample	1.64	18.3	3.46	9.3	170

Traminette

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Finger Lakes	10/3/2011	W Keuka	1.57	19.4	3.03	8.7	104
Finger Lakes	10/3/2011	W Seneca	HARVEST				
Hudson Valley	10/3/2011	HV Lab	1.83	17.0	3.42	7.3	151
Hudson Valley	10/3/2011	W HV	HARVEST				
Lake Erie	10/3/2011		2.21	21.8	3.00	8.7	90
Average	10/3/2011		1.87	19.4	3.15	8.2	115
Prev Sample	9/27/2011		1.77	20.0	3.09	8.1	90
'10 Average `	10/4/2010		1.68	20.5	3.31	8.3	137

Vignoles

Region	Harvest Date	Description	Ber. Wt. g.	° Brix	pH	TA g/L	YAN (ppm)
Finger Lakes	9/20/2011	W Keuka-VSP, Shoot thin	HARVEST				
Finger Lakes	9/20/2011	W keuka-VSP, No Thin	HARVEST				
Finger Lakes	9/20/2011	W keuka-high wire ST	HARVEST				
Finger Lakes	9/20/2011	W keuka-high wire NST	HARVEST				
Final Sample	9/20/2011		1.42	22.4	3.09	11.7	149
'10 Average	9/20/2010		1.65	23.2	2.19	13.3	231

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- Interestingly, the 3 pre-veraíson and 3 post-veraíson foliar N sprays alone (without soil application) and the soil + 3 pre-veraíson foliar applications did not increase *botrytis* to the same extent.

- In the cluster-thin treatments, we dropped them beneath the trellis early in July (shortly after fruit set). the rotting clusters may have provided additional infections/inoculum that made its way into the fruiting zone above (see crop thin treatments, *Figure 2*)

Bottom line: The best we were able to do in this experiment was to bump up YAN from around 40 to 100 ppm. Significant – but still well below the 200 ppm considered to be the minimum for wine-making. In this banner year for *botrytis*, the most extreme treatments also dramatically increased *botrytis* severity from around 8% to 45%. The 3 foliar 'post-veraíson' sprays increased YAN (to 90 ppm), without increasing *botrytis* severity much (12% compared to 8% in 'control'). These results are consistent with earlier trials dating from 2003, where Wayne Wilcox found that supplemental N increased latent infections (when applied at bloom) and *botrytis* severity (later in the season).

See Also: Two articles in *Veraíson to Harvest #6* from 2010 provide more background on YAN and 2010 results from this project.

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Finger Lakes Grape Program

Lake Erie Regional Grape Program

Hudson Valley Regional Fruit Program