

# VERAISON TO HARVEST

## Statewide Vineyard Crop Development Update #5



Cornell University  
Cooperative Extension

October 9, 2009

Edited by Tim Martinson and Chris Gerling

### Around New York...

#### Statewide (*Tim Martinson*)

In contrast to last week's samples, this past Monday's (October 5 - see Fruit Maturity Table pp. ) samples showed only modest movement in maturity indices – reflecting rainfall and cool temperatures last week. Brix and pH rose slightly, but titratable acidity changed little, remaining 1 to 2 grams higher than last year at this time. Chris Gerling offers some considerations for managing acidity (starting on p.3) in the winery this week, and we report the first batch of yeast-assimilable nitrogen (YAN) numbers from final preharvest fruit samples. This week I visited 15 riesling vineyards, and found a great diversity in berry and cluster size – but surprisingly little *Botrytis*. Fruit in almost all vineyards was clean. Several warmer days and some sunshine this week will probably be reflected in the numbers next week, and flavors should continue to develop, even as changes in brix, pH, and acidity slow. It looks like another good Riesling year.



*Finger Lakes: Conveying fruit to the crusher/destemmer at Hosmer Winery, Cayuga Lake.*

*Photo by Tim Martinson*

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

Cool sunny weather has been the predominant weather pattern this fall on Long Island. An occasional rain has been welcome given the dry conditions through August and early September. Downy mildew has not been a factor in most vineyards despite larger than normal canopies, a result of more than ample rainfall in June. Cluster rot has been similarly inconsequential. Some relatively pure *Botrytis* infections can be found but not at worrisome levels. Harvest of Sauvignon Blanc and Chardonnay started this past week. According to industry veteran Rich Olsen-Harbach, winemaker at Raphael, the conditions this harvest are ideal for Sauvignon Blanc. Fruit is clean and yields are moderate with 2 tons/acre on young vines, 3 on older vines. Sugars range from 21-23 Brix and acids are lively and crisp at around 7 g/l. In warmer years, loss of acids can precipitate harvest. At the research vineyard, acids were solid, over 10 g/l, but fruit flavors were intense and balanced. The vines were highly variable in crop level however with fully cropped vines adjacent to vines with no crop. This variable set phenomenon was pronounced in our Sauvignon Blanc. Though we did see this same vine to vine variability in several commercial blocks, Sauvignon Blanc overall has emerged from the challenges of 2009 with beautiful fruit.

#### Finger Lakes (*Hans Walter-Peterson*)

Harvest in the Finger Lakes feels like it's in a bit of a holding pattern right now for many vineyards and wineries. With most of the early native and hybrid varieties picked by now (Niagara, Seyval, Cayuga, etc.), many are waiting for a few more days to really start the push to bring mid-season and later fruit. Chardonnay is making its way to more crush pads this week, but some places are still waiting a few more days before starting. Pinot Noir has been harvested in several vineyards over the past several days as well, with winemakers saying that they are pretty pleased with the quality of it so far. Riesling harvest probably won't begin for most places for at least another week. Right now, the main concern is about our ability to adequately (as opposed to fully) ripen later season red varieties. Concord harvest continues to plug along for bulk processors like Constellation and Royal.

The biggest thing that we have going for us right now is that there is very little bunch rot of any kind in most vineyards right

now. This will give growers and wineries a little more comfort with leaving fruit to hang a little while longer. Temperatures for the first part of next week are forecast to be in the 40s for the most part with chances for showers each day for the next several days. Hopefully the low temperatures will keep any potential disease spread to a minimum, but it certainly won't help much with ripening either.

### Lake Erie (*Jodi Creasap Gee*)

According to National Grape Cooperative's harvest update this week, the North East, PA plant processed almost 5,500 tons of Niagara fruit this year. Pre-harvest estimates were higher than the actual crop, which is smaller than average. The Concord harvest should be starting soon for all the processors – perhaps this week or next, and preferably before the fruit degrades due to the weather. This is, after all, October in Western NY! Our weather has continued to be mostly rain-filled, cool, and very windy. We are all grateful for periodic bouts of sunshine, but the fruit quality is tenuous in some vineyards, and growers are anxious to get the fruit picked before it turns to complete rot. Leaves in Concord, Niagara, and other vineyards are turning varying shades of yellow and brown as vines begin to shut down under the stress of a poor growing season and challenging fall weather.

### Hudson Valley (*Steve McKay & Steve Hoying*)

Rain in the Hudson Valley has not been as much of a problem as expected. Although measurable amounts have fallen, rain has not resulted in berry splitting, probably because the soil has been consistently moist during the season. Temperatures have generally been favorable for brix levels to continue to rise, and flavor to develop. Red varieties still lag in maturity, and growers are hoping to not have any significant frost in the near future, to allow late season reds to continue ripening. Fruit rots have still not been a major problem this year.

'Vignoles' and 'Valvin muscat' are being harvested with suitable acid and sugar readings. 'Traminette' will be harvested next week. Actually a number of ripening varieties will make the coming week a busy harvest period. 'Chardonnay' has been of good quality so far, and 'Seyval' has too in well-managed vineyards. Growers continue to be more convinced about the importance of good management for 'Seyval' in order to harvest a quality crop. Those vineyards where thinning and shoot manipulation was

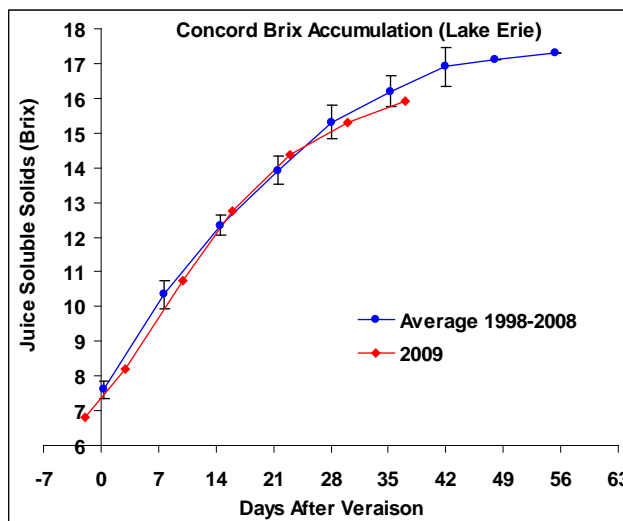
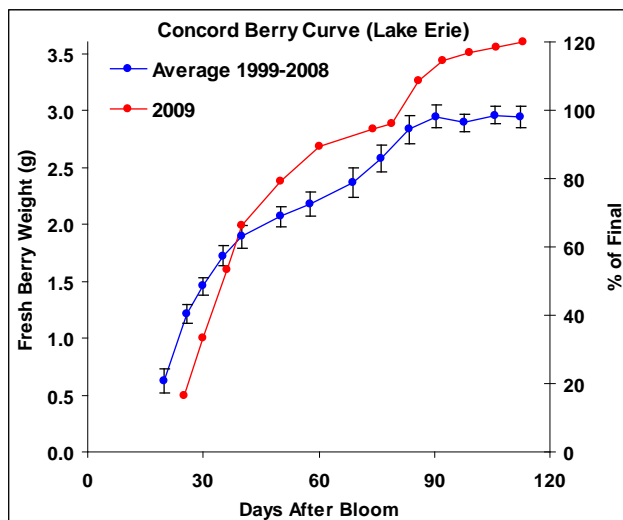
practiced to promote early fall exposure of fruit have been harvested earlier, and with better quality fruit. 'Dechaunac', 'Frontenac', and 'Noiret' are nearing maturity, but not yet harvested.

## LAKE ERIE CONCORD RIPENING PROFILE

*Terry Bates*

*Cornell Lake Erie Research and Extension Laboratory*

Average Concord berry weight continues to creep up with the additional precipitation and cool conditions. Berry weight on well drained gravel-loam soils ranged from 3.0 – 3.8 g and averaged 3.4 g. On heavier clay-loam soil, berry weight ranged from 3.1 to 4.5 g and averaged 3.6 g. Juice soluble solids on both soil types was just shy of 16° Brix and the rate of juice soluble solids accumulation was less than 0.09° Brix/day this past week.



## MANAGING ACIDITY IN THE WINERY

*Chris Gerling*  
*Enology Extension Associate*

In cool climate grapes and wine, high acidity is often a problem. Of course, we know that in situations with high acid, the acid is rarely the only problem. Besides the unpleasant sensation of the acid itself, the fruit character is often compressed while other aspects like green flavors and astringency are intensified.

Situations with high acid are often situations with low sugar, and the resulting wines will have lower alcohol and fewer flavor compounds. The final result is wine that can collect the full gamut of negative tasting notes even though there may be some virtue there. Negatives are accentuated and positives are minimized. Our moral: once balance is lost, the results can be ugly. This moral can be used for winemaking and also skateboarding. There are direct and indirect ways to address excess acid and attempt to bring the wine back into balance.

It's hard to talk about balance corrections without resorting to the chair-leg metaphor, which I attribute to John Martini of Anthony Road Vineyards. One leg is too long (or too short, but since we're talking about too much of something, too long felt right), and we have to figure out how to make all of them equal.

Possibility #1 is to cut the longer leg down. We have a couple of methods at our disposal: we can reduce the acid chemically or biologically.

**Chemical Acid Adjustment.** Adding calcium or potassium carbonate can cause tartaric acid to form calcium or potassium tartrate salt and precipitate out. To act on both tartaric and malic acid, calcium carbonate and seeding crystals can be added to a portion of the must where the pH has been adjusted to above 4.5, creating the infamous calcium malate-tartrate double-salt. Before I get too far ahead of myself, I should now throw in the considerations, of which there are many:

1.) Unless you go through the procedures, preparations, chants etc. necessary for the double salt correction, even when you add calcium carbonate you are only really working with tartaric acid (with potassium carbonate/ bicarbonate, it's always tartaric).

2.) In general, it's best to leave a little tartaric (0.5 g/L) acid when possible.

3.) Be aware of pH; this year has conditions that can bring more potassium in the fruit and higher pH as well as TA. Bruce Zoecklein at Virginia Tech has written about this issue, and he suggests using extended fine lees contact.

4.) Calcium (like in calcium carbonate) can lead to calcium tartrate instability. Calcium tartrate instability means crystals showing up at inopportune moments. These crystals are: a.) Not temperature dependent (like potassium tartrate), and therefore extremely hard to test for, b.) Agonizingly patient about how long they lurk before striking and c.) Often compared to glass shards when seen in a bottle of wine.

5.) In my experience, large chemical reductions (3g/L or more) often seem to strip the fruit, especially in dry aromatic wines. Big corrections seem to go better in juice than in wine.

### **Biological Adjustment: Malolactic Fermentation.**

Of course there is also the biological answer. Malolactic fermentation can aid in removing malic acid, softening mouthfeel and stabilizing the wine. One thing to keep in mind is that this year may be a high malic year, proportionally, so the pH bump resulting from the conversion to lactic acid may be large. Other routine considerations are temperatures (higher) and SO<sub>2</sub> levels (lower) necessary for ML bacteria to thrive. Returning to the chair-leg metaphor, we see that it's really hard to cut one leg to just the right length, and so it can go with acid adjustment.

Option #2 is to try to shim up the shorter leg(s) to fix the chair. There are a host of possibilities that may not act on the titratable acidity number but could have a big effect on overall mouthfeel.

**Reducing harshness and bitterness.** The first step is to limit the other species that may increase harshness and/ or bitterness. To this end, whole cluster pressing for whites and avoiding extended macerations in reds may be advisable. Adding tannins to stabilize color is probably good, since color may be lacking in high acid fruit. Heat treatment of must, if it is an option for you, may help to eliminate grassy flavors as well as kill off molds and rot organisms that may also be present.

*Continued on Page 8*

## FRUIT MATURATION REPORT - 10/05/09

Samples reported here were collected on **Monday, October 5, 2009**. Where appropriate, sample data from 2008, averaged over all sites is included. Tables from 2008 are archived at [www.grapesandwine.cals.cornell.edu/extension/vtohp.php](http://www.grapesandwine.cals.cornell.edu/extension/vtohp.php)

### Cabernet Franc

Region	Harvest Date	Description	Berry Wt. (g)	% Brix	pH	TA (g/L)
Finger Lakes	10/05	W Seneca Lake	1.77	19.8	3.14	11.7
		E Seneca Lake	1.40	18.9	3.14	14.6
		Cayuga Lake	1.65	17.8	3.17	12.1
Hudson Valley	10/05	HV Lab	1.50	19.7	3.39	10.4
Lake Erie	10/05	Fredonia	1.42	18.3	3.31	12.2
Long Island	10/05	S Side North Fork	1.35	18.9	3.49	10.5
		N Side North Fork	1.31	18.9	3.42	10.6
<b>Average</b>	<b>10/05</b>		<b>1.49</b>	<b>18.9</b>	<b>3.29</b>	<b>11.7</b>
<i>Prev Sample</i>	<i>9/28</i>		<i>1.47</i>	<i>18.3</i>	<i>3.22</i>	<i>11.2</i>
<i>'08 Average</i>	<i>10/06/08</i>		<i>1.67</i>	<i>19.8</i>	<i>3.28</i>	<i>8.8</i>

### Catawba

Region	Harvest Date	Description	Berry Wt. (g)	% Brix	pH	TA (g/L)
Finger Lakes	10/05	Cayuga Lake	2.71	16.1	3.29	5.1
<b>Average</b>	<b>10/05</b>		<b>2.71</b>	<b>16.1</b>	<b>3.29</b>	<b>5.1</b>
<i>Prev Sample</i>	<i>9/28</i>	<i>Cayuga Lake</i>	<i>2.58</i>	<i>16.0</i>	<i>3.18</i>	<i>5.5</i>
<i>'08 Average</i>	<i>--</i>		<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>

### Chancellor

Region	Harvest Date	Description	Berry Wt. (g)	% Brix	pH	TA (g/L)
Lake Erie	10/05	No Shoot/Cluster thin	1.79	17.3	3.35	10.4
		Mechanical Shoot thin	1.79	18.5	3.32	11.3
		Mechanical Cluster Thin	1.74	17.4	3.36	11.1
<b>Average</b>	<b>10/05</b>		<b>1.77</b>	<b>17.7</b>	<b>3.34</b>	<b>10.9</b>
<i>Prev Sample</i>	<i>9/28</i>		<i>1.68</i>	<i>16.9</i>	<i>3.21</i>	<i>10.8</i>
<i>'08 Average</i>	<i>--</i>		<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>

### Chardonnay

Region	Harvest Date	Description	Berry Wt. (g)	% Brix	pH	TA (g/L)
Finger Lakes	10/05	W Seneca Shoot Thin	H	H	H	H
		W Seneca Noshoot thin	H	H	H	H
		Cayuga Lake	1.55	19.6	3.04	15.7
Hudson Valley	10/05	HV Lab	1.67	19.6	3.54	8.8
		North Hudson Valley	1.67	17.8	3.51	8.7
Long Island		S Side North Fork	1.58	18.4	3.46	12.3
<b>Average</b>	<b>10/05</b>		<b>1.62</b>	<b>18.9</b>	<b>3.39</b>	<b>11.4</b>
<i>Prev Sample</i>	<i>9/28</i>		<i>1.65</i>	<i>18.7</i>	<i>3.26</i>	<i>10.4</i>
<i>'08 Average</i>	<i>10/06/08</i>		<i>1.56</i>	<i>20.2</i>	<i>3.23</i>	<i>8.9</i>

### Concord

Region	Harvest Date	Description	Berry Wt. (g)	% Brix	pH	TA (g/L)
Finger Lakes	10/05	Keuka Lake	3.60	15.3	3.38	6.3
<b>Average</b>	<b>10/05</b>		<b>3.60</b>	<b>15.3</b>	<b>3.38</b>	<b>6.3</b>
<i>Prev Sample</i>	<i>9/28</i>		<i>3.86</i>	<i>14.2</i>	<i>3.34</i>	<i>5.6</i>
<i>'08 Average</i>	<i>10/06/08</i>		<i>3.69</i>	<i>17.4</i>	<i>3.38</i>	<i>5.7</i>

## Corot Noir

Region	Harvest Date	Description	Berry Wt. (g)	% Brix	pH	TA (g/L)
Finger Lakes	10/05	Shoot thin/Leaf Removal	2.25	16.8	3.35	9.2
		No Shoot Thin/No Leaf Rem	2.23	16.3	3.33	8.8
<b>Average</b>	<b>10/05</b>		<b>2.24</b>	<b>16.6</b>	<b>3.34</b>	<b>9.0</b>
<i>Prev Sample</i>	<i>9/28</i>		<i>2.18</i>	<i>16.2</i>	<i>3.23</i>	<i>9.1</i>
<i>'08 Average</i>	<i>10/06/08</i>		<i>2.32</i>	<i>16.7</i>	<i>3.38</i>	<i>6.4</i>

## Gewürztraminer

Region	Harvest Date	Description	Berry Wt. (g)	% Brix	pH	TA (g/L)
Hudson Valley	10/05	HV Lab	1.61	20.4	3.80	6.7
<b>Average</b>	<b>10/05</b>		<b>1.73</b>	<b>19.6</b>	<b>3.70</b>	<b>6.3</b>
<i>Prev Sample</i>	<i>9/28</i>		<i>1.73</i>	<i>19.6</i>	<i>3.70</i>	<i>6.3</i>

## Marechal Foch

Region	Harvest Date	DescriptionS	Berry Wt. (g)	% Brix	pH	TA (g/L)
Hudson Valley	10/05	HV Lab	H	H	H	H
<b>Average</b>	<b>10/05</b>		<b>1.09</b>	<b>23.2</b>	<b>3.52</b>	<b>8.3</b>
<i>Prev Sample</i>	<i>9/21</i>		<i>1.11</i>	<i>21.7</i>	<i>3.65</i>	<i>7.8</i>
<i>'08 Average</i>	<i>9/22/08</i>	(FINAL-HARVESTED)	<i>1.02</i>	<i>24.1</i>	<i>3.18</i>	<i>12.8</i>

## Leon Millot

Region	Harvest Date	Description	Berry Wt. (g)	% Brix	pH	TA (g/L)
Finger Lakes	9/28	Shoot Thin	Harvested			
		No Shoot Thin	Harvested			
<i>Final Average</i>	<i>9/21</i>		<i>0.90</i>	<i>22.3</i>	<i>3.12</i>	<i>15.4</i>

## Merlot

Region	Harvest Date	Description	Berry Wt. (g)	% Brix	pH	TA (g/L)
Hudson Valley	10/05	HV Lab	1.95	19.1	3.57	8.3
Long Island	10/05	S Side North Fork	1.79	19.5	3.65	8.9
		N Side North Fork	1.84	17.0	3.50	10.5
<b>Average</b>	<b>10/05</b>		<b>1.86</b>	<b>18.5</b>	<b>3.57</b>	<b>9.2</b>
<i>Prev Sample</i>	<i>9/28</i>		<i>1.89</i>	<i>18.3</i>	<i>3.45</i>	<i>8.7</i>
<i>'08 Average</i>	<i>10/06/08</i>		<i>1.69</i>	<i>20.5</i>	<i>3.43</i>	<i>6.3</i>

## Noiret

Region	Harvest Date	Description	Berry Wt. (g)	% Brix	pH	TA (g/L)
Finger Lakes	10/05	W Seneca Shoot Thin	2.08	16.4	3.25	9.8
		W. Seneca No shoot thin	2.07	15.5	3.27	9.7
Hudson Valley	10/05	HV Lab	1.63	17.3	3.39	7.7
		W. Hudson Valley	1.65	17.5	3.35	8.6
Lake Erie	10/05	Sheridan-no treatment	1.97	16.5	3.25	12.5
		Sheridan-crown gall	2.31	16.3	3.23	13.0
<b>Average</b>	<b>10/05</b>		<b>1.95</b>	<b>16.6</b>	<b>3.29</b>	<b>10.2</b>
<i>Prev Sample</i>	<i>9/28</i>		<i>1.82</i>	<i>16.4</i>	<i>3.19</i>	<i>10.6</i>
<i>'08 Average</i>	<i>10/06/08</i>		<i>1.96</i>	<i>17.9</i>	<i>3.09</i>	<i>10.7</i>

## Pinot Noir

Region	Harvest Date	Description	Berry Wt. (g)	% Brix	pH	TA (g/L)
Finger Lakes	10/05	E Seneca Lake	1.60	21.3	3.32	9.9
Hudson Valley	10/05	HV Lab	1.79	20.9	3.39	11.0
		Mid Valley	1.41	18.7	3.54	9.2
<b>Average</b>	<b>10/05</b>		<b>1.60</b>	<b>20.3</b>	<b>3.42</b>	<b>10.0</b>
Prev Sample	9/28		1.62	19.5	3.27	10.0
'08 Average	10/06/08	(final sample)	1.26	22.8	3.37	9.3

## Riesling

Region	Harvest Date	Description	Berry Wt. (g)	% Brix	pH	TA (g/L)
Finger Lakes	10/05	W Seneca-Shoot thin/Leaf Rem	1.76	18.7	2.99	16.4
		W Seneca-No Shoot Thin/No Leaf Rem	1.38	15.9	2.97	16.3
		E Seneca (1)	1.79	18.3	2.99	17.0
		E Seneca -shoot thin (2)	1.63	17.5	3.06	15.7
		E Seneca - no shoot thin (2)	1.48	16.8	3.04	15.2
		Cayuga Lake	2.01	18.3	2.99	17.3
Hudson Valley	10/05	North Hudson Valley	1.86	16.3	3.33	10.6
Hudson Valley		HV Lab	2.00	18.6	3.36	10.4
Lake Erie	10/05	Fredonia -No Thin/No leaf rem	1.67	17.0	3.22	14.5
		Fredonia - No leaf rem/late hedge	1.62	15.7	3.21	15.0
		Fredonia-Leaf rem/early hedge	1.52	16.8	3.21	14.0
		Fredonia-No leaf rem/early hedge	1.48	17.1	3.19	14.5
		<b>Average</b>	<b>10/05</b>		<b>1.68</b>	<b>17.3</b>
Prev Sample	9/28		1.67	16.5	3.06	14.0
'08 Average	10/06/08		1.64	18.3	2.94	12.7

## Sauvignon Blanc

Region	Harvest Date	Description	Berry Wt. (g)	% Brix	pH	TA (g/L)
Long Island	10/05	S Side North Fork	1.72	20.4	3.30	13.0
<b>Average</b>	<b>10/05</b>		<b>1.72</b>	<b>20.4</b>	<b>3.30</b>	<b>13.0</b>
Prev Sample	9/28		1.86	18.9	3.17	12.8
'08 Average	9/22/08	(FINAL -HARVESTED)	1.77	20.1	3.03	10.8

## Seyval Blanc

Region	Harvest Date	Description	Berry Wt. (g)	% Brix	pH	TA (g/L)
Finger Lakes	10/05	Cayuga - Cluster thin/Shoot thin	H	H	H	H
		Cayuga - no Cluster/no shoot thin	H	H	H	H
Hudson Valley	10/05	HV Lab	1.98	19.0	3.42	7.2
		W Hudson Valley	H	H	H	H
<b>Average</b>	<b>10/05</b>	(One sample only)	<b>1.98</b>	<b>19.0</b>	<b>3.42</b>	<b>7.2</b>
Prev Sample	9/28		1.91	18.7	3.26	7.3
'08 Average	9/22/08	(Final '08 sample)	2.16	21.5	3.04	9.0

## Traminette

Region	Harvest Date	Description	Berry Wt. (g)	% Brix	pH	TA (g/L)
Finger Lakes	10/05	Shoot Thin	1.95	17.1	3.00	11.9
		No Shoot Thin	1.67	17.4	2.99	12.1
Hudson Valley	10/05	HV Lab	1.98	19.0	3.22	10.7
		W Hudson Valley	1.46	15.7	3.23	10.3
Lake Erie	10/05	No Shoot Thin (1)	2.21	16.5	3.19	13.1
		Shoot Thin (1)	2.14	17.0	3.21	12.5
		No Shoot thin (2)	2.02	15.2	3.16	16.1
		Shoot Thin (2)	2.01	15.1	3.17	14.9
<b>Average</b>	<b>10/05</b>		<b>1.93</b>	<b>16.6</b>	<b>3.15</b>	<b>12.7</b>
<i>Prev Sample</i>	<i>9/28</i>		<i>1.92</i>	<i>16.1</i>	<i>3.07</i>	<i>12.5</i>
<i>'08 Average</i>	<i>10/06/08</i>		<i>1.95</i>	<i>20.6</i>	<i>3.03</i>	<i>10.3</i>

## Vignoles

Region	Harvest Date	Description	Berry Wt. (g)	% Brix	pH	TA (g/L)
Finger Lakes	10/05	Shoot thin	1.78	19.5	3.19	14.8
		No shoot thin	1.48	16.9	3.14	15.2
<b>Average</b>	<b>10/05</b>		<b>1.63</b>	<b>18.2</b>	<b>3.17</b>	<b>15.0</b>
<i>Prev Sample</i>	<i>9/28</i>		<i>1.69</i>	<i>18.1</i>	<i>3.12</i>	<i>12.4</i>
<i>'08 Average</i>	<i>--</i>		<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>

## YEAST ASSIMILABLE NITROGEN *Chris Gerling*

This year we will be measuring the Yeast Assimilable Nitrogen (YAN) on the final (harvest) samples submitted for V to H. YAN represents the sum of Ammonia (amm) and Free Amino Nitrogen (FAN) on the accompanying table. Nitrogen levels play a large role in yeast nutrition during fermentation and deficiencies can lead to stressed and/or sluggish fermentations and potential off-aromas. Furthermore, compounds with implications for human health are also related to the amount and types of nitrogen compounds contained in must and wine. The generally agreed upon minimum YAN for a successful fermentation is in the range of 150 mg/L, while the optimum levels are considered to be at least 200 mg/L and often higher. Ramón Mira de Orduña's lab is doing survey work on YAN and we hope to measure more with the new ChemWell Analyzer. Next week there will be a full article on Nitrogen in winemaking.

Region	Harvest Date	Variety	Description	Ammonium Nitrogen mg/L	Free Amino Nitrogen mg/L	YAN mg/L
Finger Lakes	10/6	Chardonnay	Cayuga Lake	31	57	88
	9/22	Leon Millot	Shoot thin	14	64	78
	9/22	Leon Millot	No shoot thin	13	58	71
	9/29	Seyval Blanc	cluster thin/shoot thin	16	146	162
	9/29	Seyval Blanc	no cluster/shoot thin	12	115	127
Hudson Valley	9/28	Marechal Foch	HV Lab	35	228	263
	9/21	Seyval Blanc	W Hudson Valley	83	139	222
Lake Erie	10/5	Chancellor	Mechanical shoot thin	52	123	175
	10/5	Chancellor	Mechanical cluster thin	30	154	184
	10/5	Chancellor	no shoot cluster thin	28	144	172
Long Island	10/5	Chardonnay	S side North fork	129	210	339
	10/5	Sauv. blanc	S side North Fork	32	164	196

**Residual Sugar.** As mentioned previously, sugar and resulting alcohol may be low, so the fairly straightforward solution is to add more. More sugar will lead to more alcohol, and this will help stand up to the acid and potentially lend a riper, warmer character. You can also add enough sugar to stop the fermentation early, leaving another useful tool: residual sugar. When dealing with lots of acid and alcohol, a gram or two can go undetected while bringing richness and balance. This can work for reds as well as whites (just remember that when you have a red wine with RS, you now have a wine that needs stabilization and filtration to keep out *Brettanomyces*). As the TA runs higher, more sugar may be not just welcome but necessary to keep the mouthfeel in harmony.

**Blending.** Last but not least, blending can be an invaluable tool and can be deployed in at least a couple of ways. When using just one grape variety, early harvests can be blended with later ones to get the virtues of each. Combining varieties can increase your options even more.

**Reducing Green Flavors.** High acid fruit may have some green (vegetal, herbaceous) characters, and there are a few ways to deal with these.

Gavin Sacks, methoxypyrazine-ologist, suggests making rosés by treating 90% of the fruit as a white-no skin contact whatsoever- and preparing the other 10% just like a red (skins throughout fermentation). MPs are extracted in the first 24-48 hours of contact, so ~90% should be relatively MP-free, while the ~10% that goes through the full process will bring tannin and more stable color to the party. Note: this calculation is about MPs and not designed to automatically give you desired color. It may need tweaking.

Gavin also feels that certain types of oak will combat green flavors more effectively than others. Oak that lends more sweet, vanilla character should mask the green while products that give sawdust or overly-toasty notes may actually amplify green.



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Finally, he adds that MPs are a proxy for green and not all of green, so you could have a green wine with no MPs or a non-green wine with MPs in concentrations over the sensory threshold. Gavin's lab has been working with a highly experimental fining agent for MPs that they are far from ready to widely recommend at this point. If you have a small amount of must that is so green you'll toss it otherwise, however, he would be willing to talk to you about a trial.

In summary, nothing happens in a vacuum. High acidity rarely means just high acid and high acid alone. Knowing the direct and indirect consequences can help you address the various areas of the winemaking process where you can bring balance back. Like fixing a chair with uneven legs, this is not easy and can lead to embarrassing injuries and profanity. With patience and determination, however, you can hopefully reach the ideal: no one can tell anything was ever off-balance. Finally, I would offer the proverb that numbers are just numbers, and not inherently good or bad. Let them inform you, but don't let them own you. Best of luck and stay safe.

