After he rattles off the criteria, he realizes that this day he remembers as being the “standard” probably only took place a handful of times, and was actually much more the exception than the rule.

If I described the 2013 growing season as normal, and it’s the only season between 2008 and now where I have used that term, I must accept that even though I qualified my description then, I still had it backwards.

Continued on next page

Final Issue...

THE 2015 GRAPE & WINE SEASON: REDEFINING NORMAL

Chris Gerling
Enology Extension Associate

I would describe it as a vintage that defies any attempt at journalistic narrative.

–Kelby Russell, Red Newt Cellars

In the book Fever Pitch, Nick Hornby describes the necessary conditions for a successful Arsenal soccer game when he was a kid—how many goals Arsenal would score (winning, of course), where he and his father would eat afterward, how everyone would get along, etc.

Continued on next page

Last Day of Harvest. Lodi, NY grower Bill Dalrymple harvesting ‘Ives’ grapes October 19 on east Seneca Lake.

Photo by Tim Martinson

Last Pressing of Pinot noir at Heart & Hands Wine Company. Union Springs, NY on east side of Cayuga Lake.

Photo courtesy Tom Higgins
The wines look really good, but there was cause for doubt throughout much of the summer. The weather was exasperating at times but in the end gave us what we needed when we really needed it. You know: business as usual.

Winter & Spring. Winter really shouldn’t play a recurring starring role in a winemaking recap, but once again I fall prey to my ideas of how I think things should be versus the evidence at hand. The short version is that 2014/2015 was the second straight winter where everyone thought about moving to Palm Springs. In many parts of the state it was not extremely cold or extremely snowy, but it was plenty cold and plenty snowy for an extremely long stretch.

Looking at Figure 1A, Geneva lows danced very close to the LT50 line (temperature required to kill 50% of the primary buds) for Cabernet Franc a couple of times, but managed to stay on the right side of it.

In Lake Erie, it was not just fairly cold, it was super cold, and as a result there are basically no vinifera grapes in 2015. Figure 1B tells the story, as even the LT90 (temp required to kill 90%) is left in the dust.

Table 1 shows the minimum temps for mid-February across the state, and Chautauqua County was indeed a chilly place to be. While not seeing the outright devastation of the vinifera, hybrids and natives were still affected in many Lake Erie vineyards. Even Concord had significant bud injury, and Niagaras saw an estimated 45% below-average yield due to extensive trunk injury (see Luke Haggerty and Kevin Martin article, p 5).

Figure 1. Daily minimum and maximum temperatures (blue area) and low temperature exotherms indicating the 50% (black line) and 10-90% bud freezing temperatures from Cabernet Franc buds collected weekly at Geneva, NY (left), and Riesling from Portland, NY at the CLEREL Lab (right).
Finally the cold was behind us, and we could prepare for some serious rain. Those heavy June rains apparently laid the foundation for some rot issues that could really explode if given the chance at a later date (cue ominous music).

**Summer.** After the indelible scars of winter and spring, summer almost seemed fairly nondescript. That this was the warmest of the past three years by heat accumulation came as a bit of a surprise to us, although the surprise can be at least partially explained by the fact that our relatively stellar GDD months were May and September (Fig. 2)

The winter passed...slowly...and in March and April there was serious doubt upstate about being able to get into the vineyards with any kind of equipment before July. Budbreak was even late on Long Island, where winter was also long and cold so long as no one from Clayton or Portland is in the room to hear them say it.

The final gut-punch came in the form of a May 22 frost, which was irritating in the Finger Lakes but seriously damaging in the Thousand Islands. The fate of the before-and-after-frost crops has been monitored in our fruit composition table throughout the season.
For the most part it wasn’t noticeably hot or noticeably cool, except for on Long Island (Figure 3) where it seems to be noticeably hot every summer now. In Suffolk County, the phrase “historically early harvest” is starting to look more and more like my above definition of normal.

Moisture seemed to be an all or nothing game, with heavy June (and July in Lake Erie) rain giving way to prolonged periods with no measurable accumulation. Looking at the charts for Geneva (Fig. 2) and Riverhead (Fig. 3) June was indeed the soggiest month. July and August were both drier than they have been in the last few years, and there was a lower total rainfall from March through October.

**Fall.** In 2014, a very warm and dry September brought the season from way behind to right on schedule. This year provided a similar burst, but the period was more like mid-August to late September.

The earlier shift meant that harvest began a lot sooner than last year, and the first Veraison to Harvest samples resembled the incredibly warm and early 2012. Following Labor Day, acids were low, sugars were high and it was hard to find a cloud on a lot of days.

It would be easy to start to imagine a moderately-paced, dry fall. It would be easy to think that this state of affairs would last indefinitely. It would be easy to be quite wrong.

A serious rainstorm came through in late September and took all of the heat with it as it left. All the sudden, September 2015 was the wettest of the past three and it was time to get the grapes in.

Flashing back to the ominous music a few paragraphs ago, this late storm seemed to be the call to action the latent disease pressure had been waiting on. In what seemed like a weekend, ideas of picking sometime off in the distant future were replaced by ideas of getting ‘er done as quickly as humanly possible.

I mentioned the light switch-like way the ripening weather seemed to be replaced by cold, rain and wind this year to Sarah and Mike Eighmey of Anthony Road, and Sarah reminded me that this effect is, wait for it, normal.

**Upshot.** Statewide, the crop is down for a variety of reasons, and the associated demand from wineries has caused shortages in many vinifera and some hybrid cultivars.

Bordeaux reds and Gewürztraminer seem to be in particularly short supply, except on Long Island where everything was just fine.

Across the rest of the state, the early varieties look particularly promising, and I had more than one winemaker tell me that Pinot Noir should be phenomenal in 2015. I will be very interested to compare wines from the same cultivar that were picked before and after the rain. Acids were primarily lower his year, and I heard a few rumblings that they could even be too low in some cases.

The late reds will be rare but should be worth checking out. All in all, there is reason to be excited about the vast majority of New York wines despite the rocky road to the tank that some grapes traveled, which seems to be the case most years.

Just like...wait, what’s the word I’m looking for?
For all Lake Erie grape growers, 2015 has been a year of extremes. We had a very cold winter, extremely wet June and July, and a dry August, September and October. All of these climatic events resulted in a Concord crop with great variability, but once averaged out, one that fell just shy of the 10-year average.

Winter cold event. The past two years, the Lake Erie region harvested near-record Concord crops, and with exceptional growing conditions in 2014, there were high hopes of another bumper crop this year. Optimism shifted to worry on February 16, when low temperatures fell from -17°F to -30°F throughout the region and to inflicted freeze damage on all grape varieties. It was a record low temperature – the lowest recorded in 80 years for many weather stations in the region.

Concord Crop Average Despite Winter Injury; Niagara Crop Reduced

Luke Haggerty
Extension Viticulture Associate
Kevin Martin
Extension Farm Business Management Associate
Lake Erie Regional Grape Program
Cornell and Penn State Cooperative Extension
Cornell Lake Erie Research and Extension Laboratory

Bud mortality assessment. In response, the Lake Erie Regional Grape Program assessed over 15,000 grape buds for damage and found a large range of primary bud mortality in Concords, ranging from 10% to 80%. Hardest hit Concord vineyards were either those in low-lying areas that have a tendency to hold excess water or vineyards with vine health issues. Because it wasn’t feasible for our program to assess bud injury in every Concord block, we made efforts to educate growers how to examine their own grape buds for freeze damage. Although this practice is routine for *vinifera* growers, for most Concord and Niagara growers examining buds is a new and unfamiliar task.

Growers modify pruning practices. To compensate for the observed mid-winter bud injury, many growers left more buds than they typically do. A survey of 161 growers who attended Coffee Pot meetings in 2015 showed that 63% of growers used Extension information to assess 2015 freeze damage and modify their viticulture plan (adjust pruning levels). And 36% of growers used Extension information to conduct their own on-farm assessment of bud survival. Growers who were able to accurately estimate bud damage adjusted pruning levels accordingly.
Large berries and more buds contribute to average Concord crop. As a result, most Concord vineyards pruned after February 16th produced larger crops than those pruned before the cold event. Another contributing factor to this year’s crop was the large berry size. Much like last year, fresh berry weight was significantly higher than the 15-year average. Results from the Lake Erie Concord berry curve showed average berry weights above 3.5 grams – those are big berries! Although these contributing factors helped push Concord production to near average, they were not enough to make much of a difference to the freeze-damaged Niagara crop.

Production. Compared to last year’s bumper Concord crop, production was down approximately 14% from 2014 and near average. Niagara tonnage was slightly below average in 2014 due to winter injury (from 2013-2014 winter), but this year’s freeze damage caused production to fall a staggering 45% in 2015. The winter damage resulted in moderate to severe trunk injury in most Niagara vineyards, and it could take up to three years to rebound back to full production.

Markets and prices. The demand for bulk and retail grape juice remains largely unchanged. As established by prior market cycles, the demand curve for grape juice is particularly inelastic. The 2015 harvest is the first year low prices will really transfer to the majority of grape growers. In 2014 low prices were limited to a few processors. The larger story was the effort to reduce supply through a number of contract cancellations and contract reductions. In 2015 cancellations were relatively minimal, but prices will be significantly lower.

Average cash market prices for juice growers will be below $150 per ton. Average cash market prices for Concors used in wine production may be slightly above $200 per ton. The range for wine grape Concors is $100 - $275 per ton. With the discrepancy in prices between markets, there would be more room for average price declines in 2016. That will depend on how markets move the supply over the next eight months.

The fiscal health of all Cooperatives remains significantly stronger than the last period of declining Concord prices. We have seen large declines in cooperative payments, and payment schedules vary significantly among cooperatives. Those schedules will affect the length of time growers are subject to lower prices. At the very least, we may see these low prices impacting grower cash flow into 2020.
FRUIT CHEMISTRY TRENDS: 2011-2015

Timothy E. Martinson
Section of Horticulture
NYS Agricultural Experiment Station

One measure of the harvest season is how many weeks of fruit sampling we publish in Veraison to Harvest. In 2012 – the earliest, most compressed season, we sampled for 5 weeks. In 2013 and 2014, we sampled for 9. This year we started out sampling 77 vineyard blocks, but after the 7th week (2 weeks ago), only 5 Cabernet Franc, 1 Merlot, and 2 Riesling blocks remained unharvested (see abbreviated Fruit Composition report, p. 10).

The graphs that follow provide a 5-year summary of our weekly Veraison to Harvest samples. For five cultivars that are broadly represented in NY (Cabernet Franc, Merlot, Noiret, Riesling, and Traminette) we show trends in berry weights, brix, pH, and titratable acidity. The black dotted line represents the five-year average. For the most part, we have collected from the same blocks each year – and each of these curves is the average of 3-12 vineyards sampled across NY.

Berry Weight: No particular trend in 2015. Moisture was ample in Western NY, so most varieties ended up with the similar berry weight and size. Merlot samples (HV and Long Island) ended up with smaller berries than 2014 (yellow lines), perhaps reflecting the drier season in Eastern NY.

Brix: Juice soluble solids (bright red line for 2015); started well above those in 2014 (yellow line), and were just behind 2012 (darker red 2012). They showed smaller incremental gains late in the season (see Riesling), and ended up within 1-2°brix of the 5 year average at harvest.

pH: Juice pH was about at the 5 year average, and well ahead of 2014, which had the lowest average pH levels of the past 5 years.

Titratable acidity: TA curves tended towards the 5 year average – a big contrast with 2014, when TAs started out in the stratosphere then declined rapidly. It was also a contrast with warm 2012, where TAs started out very low. To cite one example, by the 3rd week in September, average TAs for Riesling had dropped below 10 g/l, while last year at that time they were around 14 g/l.

The ripening season started out ‘fast and early’ (like 2012), but moderated, with smaller incremental changes in fruit composition for the last half. Overall, grapes at harvest ended up with higher soluble solids, but average juice pH and titratable acidity.
This abbreviated table reports the results of our remaining samples that were collected on **Monday, October 19**. This week we calculated average only for Cabernet Franc, since other remaining varieties were only represented by one or two samples. Tables from 2014 are archived at [http://grapesandwine.cals.cornell.edu/newsletters/veraison-harvest](http://grapesandwine.cals.cornell.edu/newsletters/veraison-harvest). We are again reporting berry weight, brix, titratable acidity and pH, and yeast assimilable nitrogen (YAN).

### Cabernet Franc

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<th>pH</th>
<th>TA g/L</th>
<th>YAN (ppm)</th>
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### Catawba

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Your three graduate students are conducting field trials with cooperators in the Finger Lakes and Long Island. Can you describe the goals of these trials and where they are taking place?

Two of the projects relate to our on-going work on the potential for under-vine cover crops to reduce vine vigor and improve wine quality. MPS student Taylor Mattus has been working at Prejean winery, investigating the potential of under-vine covers to reduce vine size in Noiret. The experiment focuses on cover crops I thought might vigorously compete for water and nutrients, like chicory and tillage radish.

PhD student Ming-Yi Chou has two projects at Sheldrake Point Vineyards looking at under-vine cover crops in Cabernet Franc and Riesling.

In the Riesling experiment we’ve been studying glyphosate, cultivation, and native vegetation (i.e., weeds) for managing under the vine, and are collaborating with our microbial ecologist, Jenny Kao-Kniffin, to study the microbiome impacts in the soil and on the fruit, and how that carries through to spontaneous or natural fermentations when sulfites aren’t used.

‘Palissage’ is a canopy management term that is new to growers. What inspired you to do research on this practice, and what do you see as the potential benefits?

This practice first came to my attention in a presentation by an Alsatian grower who discussed a technique he referred to as “palissage,” where long shoot tips that would normally be hedged are tucked horizontally along the top of the canopy. The grower reported benefits of palissage on Gewürztraminer and Pinot Gris to include earlier cessation of shoot growth during the growing season and reduced/eliminated need for leaf removal in the fruiting zone due to fewer lateral shoots. I’ve heard of a few growers using the technique in Burgundy as well.

Then I learned that Thom Bechtold, vineyard manager at King Ferry Winery, had been experimenting with the practice since 2009. Bechtold re-
ported that the benefits of palissage as a replacement for hedging included a long-term reduction in vine size.

I started using this technique in some of my research blocks to preserve pruning weights and found that it seemed to reduce lateral emergence in the fruiting zone. It is still early days for our experiments on Riesling and Cabernet Franc; so far the lateral emergence is reduced, but disease incidence might be an issue, particularly at the top of the canopy.

Our early, rough estimates suggest that the cost per acre of palissage is about $125 per acre for a single pass, but by eliminating hedging and reducing the need for leaf removal, the savings could be $250-500 per acre (depending on the initial vine vigor and the reduction in needed canopy management practices).

You have been working on under-vine cover crops as part of the multistate ‘Eastern Viticulture’ project for several years. This practice has shown dramatic results in reducing excess vigor – and improving wine quality in the mid-Atlantic region – particularly with reds. What are the challenges, and what are the major impacts you’ve found here in New York?

Under-vine cover crops hold great potential for reducing vine vigor, particularly in regions with ample precipitation like the Finger Lakes. If we think about efficiency, it simply makes no sense to apply herbicides to reduce competition for water and nutrients, and then implement multiple passes of canopy management practices like hedging and leaf removal to ameliorate shading issues that are a result of large vines. The major challenge is formulating recommendations that can be applied in a broad range of vineyards.

One particular issue that sets us apart from Tony Wolf’s trials in Virginia is that growers in the Finger Lakes have to hill up to protect graft unions against winter injury. This pretty much rules out perennial ground cover under the trellis, so we’ve been looking at annual ground covers that can be seeded each year. We’ve been working at multiple mature vinifera sites for several years now and have some good candidates for potential under-vine cover crops. Dwarf chicory, for example, works really well to bring down vine size and doesn’t grow into the fruiting zone; but after a couple of years the vine size has come down far enough that I’d want to discontinue its’ use. Annual rye-grass has had only a small impact on vine size, and buckwheat has essentially had no impact at all – so it might be a good candidate for eliminating herbicide use but maintaining vine size.

The major impact of this work will be on reducing management costs. Even with the purchase of seed, an under-vine mower, and the slower speed of mowing with an under-vine mower, we’ve demonstrated considerable savings compared to herbicide use – as long as yield isn’t reduced. If yield comes down, the economics aren’t as favorable.

Your early research at Cornell looked at timing and severity of leaf removal for improving light interception. What do you see as the main impact of this research?

When I arrived at Cornell in 2007, I realized that growers knew that improving light exposure of clusters through fruit-zone leaf removal was important – and widely practiced. But practices varied widely on when to do it. It was one task among many in mid-season competing for their time and attention.

So Gavin Sacks and I set up some field trials from 2007 to 2010 to address timing and severity of leaf removal and shoot thinning. In looking at leaf removal at different timings from fruit set through
veraison, we found that earlier timing (i.e., berry set) reduced the accumulation of methoxypyrazines in Cabernet Franc by more than 50% compared to leaf removal at later stages. Working with Riesling, we found that mid-season leaf removal (about one month after berry set) actually increased the concentration of TDN, which is responsible for the petrol or fusel-like character. We then conducted further studies that demonstrated TDN increased with greater cluster light interception.

I think that growers are increasingly aware that early leaf removal in reds has tangible benefits—and some have modified their practices accordingly. One obstacle has been labor and time involved in manually removing leaves. But as more growers purchase and use mechanical leaf removal implements, precision on timing has become more practical. And I think growers are placing a higher priority on completing these tasks in a timely manner because they have been able to see the benefits.

What do you see as major challenges ahead for NY viticulture? How can research address them?

Clearly climate change and the variability that accompanies it will be a major issue, as will environmental regulations, particularly concerning our impacts on nearby water bodies. This is why I’ve been looking at how under-vine cover crops reduce nitrogen and dissolved organic carbon leaching from vineyards. Future regulations will result in a more limited toolbox to address these significant issues.

Apart from that, we still have a long way to go on clearly defining required viticultural practices to produce different styles of wines that are well-suited to our climate, particularly Riesling. The idea of “Farming for Flavor” has come a long way in the time I’ve been at Cornell, but we now have enough preliminary data and knowledge to begin to scale up to the bigger picture of “Farming for Style” so that if a producer envisions a specific wine style—such as floral Riesling with an acidic backbone and a low price point—we can recommend a suite of viticultural practices that will assist in delivering that vision.
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Thanks to the many people contributed to bringing Véraison to Harvest to press each week.

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