

Viticulture in the Eastern United States

By Mark L. Chien

Editor's Note: *This is the first of a two-part series on the unique challenges presented to grapegrowers in the Eastern United States. This first installment discusses the geographic and meteorological foundations of the area, along with an overview of the extremely difficult 2003 harvest and a brief discussion of market conditions for Eastern wineries. Next month, Chien will broach disease and pest control issues, managing viticulture in diverse seasonal weather and the academic and future marketing of the area.*

Wine is grown in a wide range of temperate climate regions around the globe, but there is tremendous variability in the degree of challenge encountered by growers across this landscape. Vines, by their nature, are tenacious plants, as anyone knows who has ever tried to kill one. In the Eastern United States, vines are often called upon to express this tenacity under sometimes harsh growing conditions--wine growers as well.

But to grow fine wine takes a special set of conditions that allow for the full maturation of fruit and the skill of the wine grower to capture the essence of the terroir. I do not use the term terroir lightly--like most ideas that enter our popular culture, it is subject to much misuse and misunderstanding. Terroir was defined for me by French geologist **Yves Herody** as the interaction between soil, climate, plant and man. These are incredibly complex systems individually and even more so when entangled in wine production.

The soil encompasses the physical, chemical and biological properties that are, to a large extent, not fully understood. Growers have focused on the inorganic chemistry in the past because it was easy to analyze and amend. It is easy to describe a good vineyard soil as well drained, but try to envision the myriad of soil types that produce fine wines, from the clays of Pomerol to schists by the Mosel, limestones of Burgundy and clay loams of Napa.

Climate, as we know, is the epitome of a chaotic system, yet to grow wine, it must be understood and adapted to at the macro, meso and micro levels. The grapevine itself is a wonder of nature. It is a miraculous thing to take sunlight and turn it into energy and carbohydrates and sugars and synthesize the flavors of an Alsatian Gewüztraminer or a Le Montrachet. It's hard not to marvel at bud burst each spring, seeing a new shoot spring from nothing, yielding two clusters that will become a delicious wine.

Finally, man's part is called viticulture, which is the way we influence the three natural elements of terroir. I mention terroir because it is at the center of any comparison between wine regions--not just at the vineyard level but in the creation of a regional wine identity. The terroir and viticulture potential exist for the production of fine wines in the East, including hybrid and native types, and wines have been produced to prove it. Identifying and exploiting the optimal terroir for any wine region involves a lengthy process of discovery. Europeans have achieved this in their great wine regions, Napa has accomplished this in the last few decades and Oregon and Washington are still searching but getting closer. In the Eastern United States, the process is only just beginning, with exciting prospects ahead for wine growers.

Geography, Climate and Varietals of Eastern Viticulture

Eastern viticulture, in a geographical, if not logical sense, extends from the north shore of Lake Ontario to Georgia. While this is a geologically, geographically and climatically diverse area, there are enough common threads among important viticulture qualities to consider it a region with sub-appellations, akin to California as a wine producing entity.

With about 25,000 total wine grape acres, including native, hybrid and vinifera varieties, the eastern wine-growing region encompasses about half the area of Napa Valley. Yet there is tremendous diversity among these relatively few acres. Varietal diversity is, in fact, the spice of eastern wine life. Wine growers are very open to trying new varieties in our region, even numbered varieties out of the grape breeding program run by Dr. **Bruce Reisch** at **Cornell** that have yet to be named. Try to imagine a smiling host pouring a wine in a Napa tasting room and saying to the customer, "You must try this NY73.0136.17--it could be the next great red for the region! And the GR-7 was especially nice in 2001." I don't think so.

Then how is this possible in the East? It is because our industry is, to a large extent, retail based and most wines are hand sold in tasting rooms. With an explanation behind a bottle of wine, customers become much more adventurous and open their palates to a broad range of new flavors. The regional palate is sweet, and the native American varieties such as Concord, Niagara, Delaware, Catawba and others are still very popular and remain the bread and butter of this industry--our White Zinfandel. Yes, there is such a thing as a great Concord wine, if you want a wine with a completely pure expression of fruit.

Interspecific varieties like Chambourcin, Chancellor, Traminette, Vidal Blanc and Cayuga White perform well in the region and can make high quality wines, especially when grown using modern viticulture methods. These varieties were developed to engage particular viticultural attributes, such as cold hardiness, disease tolerance and phylloxera resistance, to make them more suitable for the eastern environment.

Despite a variety of challenges to their successful cultivation in our region, vinifera varieties are being widely planted, with almost 12,000 acres on the Niagara Peninsula alone. Varietal suitability is still very much in disarray in most of the regions, save Long Island, which is focusing on Bordeaux varieties, and the Finger Lakes, where the beauty of Riesling has been rediscovered. Virginia appears to like Viognier and Chardonnay and is intrigued by Norton. The Niagara Peninsula has its Bordeaux and Burgundy camps, depending on location relative to the escarpment and the lake. Pennsylvania, with its moderate climate, has a wide range of possibilities, thereby complicating the selection process. For now, the Bordeaux reds, Chardonnay and Pinot Gris are being widely planted. And everyone seems to be curious about Syrah. The main challenge is to find the vinifera varieties that have a measure of cold hardiness and fit the season length ripening requirements. With susceptibility to cold injury occurring around -5°F, careful consideration must be given to site location.

The climate of the East is continental in nature and therefore more varied than California, or even Oregon and Washington, with the exception of the near coastal regions. Northern areas are generally colder, have shorter seasons and greater threat of winter injury to vines. Summers are characterized by humidity and regular precipitation and, in some southern regions, persistent and elevated heat. Those conditions create a petri dish-like effect in the vineyard, which leads to problems with disease and pests.

Spring and fall frosts offer the grower hazards at both ends of the season. In 2001, a late May frost devastated many vineyards, and in the fall of 2002, an early October frost knocked the leaves off vines before the late red varieties were fully ripe. Site selection strives for 180 frost-free growing days, but even local site virtues can be overcome by the occasional strong cold front. It can be a struggle to achieve fruit maturity in almost any region in a cool year like 2003. Unlike the western coastal climates, diurnal temperature variation is more modest in all regions of the East, even by the shore, which according to **John Gladstone** may represent a viticultural advantage.¹

In warmer parts of Virginia, North Carolina and Georgia, elevation and aspect can be important for mitigating high summer temperatures. Soils cover a wide range, from the sandy soils on Long Island to the heavy clays of the Niagara Peninsula to the weathered granites, shale and schists of the Piedmont Plateau in the Mid-Atlantic. Many of these soils offer ideal vineyard soil attributes such as good drainage and water holding capacity, moderate fertility, adequate depth and organic matter.

What is lacking is the singular focus on finding the best vineyard sites. That usually occurs once an industry has matured and confidence in its viticultural potential is established. But resources are being developed to

seek out the best sites, from consultations with soil scientists to the use of GIS site evaluation models being developed at **Virginia Tech**, **Penn State** and **Cornell**. Other site attributes, such as elevation, slope, and aspect are also being considered for their optimal potential in wine growing. Identifying and exploiting our best terroir remains one of the most daunting challenges to fine wine production in the East.

The Challenges of 2003

There are two key requirements to making great wine--full fruit maturity and clean grapes. Much of viticulture is focused on achieving these two goals and both present severe challenges in the East. I have already illustrated some of the climatic realities that often limit complete ripening of late hybrid and vinifera grapes, particularly red varieties. Fortunately, as we learn more about proper site selection and combine this with modern viticulture, it becomes possible to improve the quality of our wines.

The 2003 growing season can serve to illuminate the challenges of Eastern grape growing. From the very start, this vintage shaped up to be what is euphemistically called a "winemaker's year." The year began with one of the coldest winters on record. Here in Lancaster, close to 75 inches of snow fell. Snow isn't always bad; it helps to protect delicate graft unions from cold injury. However, vineyards in the Lake Erie, Finger Lakes and Ontario regions sustained heavy bud losses and, in some cases, trunk damage or vine mortality. Yields in these areas are down as much as 50 percent in some varieties.

The long winter was followed by approximately one hour of spring-like weather and a very ragged bloom period resulting in poor fruit set in some varieties and widespread incidence of early leaf and cluster botrytis. The *Farmer's Almanac* predicted 17 sunny days this summer and we were lucky if we got that many. A cooler than normal summer with persistent rains and ample humidity made the disease and pest situation almost unbearable. However, growers upped their canopy management practices and tightened their spray programs, and vines actually looked fairly good going into veraison. Some growers sprayed as many as 20 times (yes, that's TWO-ZERO) this season to keep disease and insects at bay. By that time, some varieties, especially late reds, were anywhere from two-to-three weeks behind. Despite this tardiness, the prospect of a reasonable Indian summer bolstered hopes that the vintage could be saved. Optimism was dampened when areas of southeast Pennsylvania took 20 inches of rain in September (that's TWO-ZERO inches!), with Hurricane Isabel providing an exclamation point. Only in mid-October, did the weather moderate with some warm, dry and sunny days--perhaps too little, too late for some varieties.

Disease control started to break down as weariness and climate conditions overcame the hard work of previous months. The usual late season culprits, downy mildew and botrytis appeared on schedule. In the Great Lakes area, the multicolored Asian lady beetle, absent since 1991, reappeared; this introduced insect can taint wine at levels as low as one bug per liter of juice. An early fall frost hit many growers around the region in early October, knocking off precious leaves that were needed to ripen fruit and store carbohydrates for cold hardiness. The yellow jackets, wasps and birds have been vicious this season, piercing berries and allowing secondary rot organisms to move in.

Growers persevere nevertheless, and many still have reds hanging on the vines, accumulating precious flavors but precious little sugar. Old timers exclaim that this is one of the most difficult vintages since the modern East Coast wine industry formed in the late 1960s. I have grown grapes for over 20 years, and I experienced many a soggy vintage in Oregon, but this was by far the most challenging growing season I can remember. This is in stark contrast to the 2002 vintage, when Eastern vineyards suffered through a monumental drought season. Vintage variability is a fact of viticultural reality in the East, as in the European tradition.

Whatever the conditions, it's a certainty that some very good wines will be produced from vineyards that went the extra mile to ripen their fruit and insure cleanliness into the cellar. In fact, I had the pleasure of tasting some very nice barrel and tank samples on a recent tour through Virginia. **Brad McCarthy**, one of Virginia's most experienced wine makers, emphasizes the importance of flexibility and instantaneous

adaptability in winemaking protocol during a vintage like this. In five minutes, the whole winemaking plan for the vintage can change completely.

A common winemaking problem is grapes with high pH and high acid and how to bring those attributes into balance. Fortunately, tools and methods are being used by the better growers and wineries to cope with adverse conditions and fruit. Sorting grapes is one key practice, both in the field and at the crush pad. Fermentation regimes, enzymes, saignee and other tricks of the trade help to concentrate flavors and color. Blending is very critical in difficult years. Even thermal vinification can be used to help offset the effects of botrytis in grapes and to push color. Concentrators may prove to be appropriate for our climate, although I do not know of any that are currently in use in our region. This may be an indication of the relatively poor capitalization of many of our vineyards and wineries in areas outside of Long Island, Niagara Peninsula and parts of Virginia.

Market for Eastern Wines

The market for Eastern wines is essentially a local and regional one. In Pennsylvania, all 85 wineries are family owned and operated. The largest winery produces 85,000 gallons, but the average is around 9,000 gallons. Wineries can have five extensions of premise under their winery license, which allows them to operate tasting rooms in malls and other satellite locations. Many wineries grow as much as the limitations of their sales in these facilities permit and then cap their production. Because the business is all retail, most do very well from a small business standpoint. Few wineries elect to enter the three-tier system, which, to a large extent, limits expansion into out of state markets. This includes an avoidance of the state liquor stores system by most Pennsylvania wineries.

However, a new breed of young and ambitious wine growers, eager to show off their quality, would like to sell wines in fine restaurants and shops and compete in the big cities. This is happening all across the region as growth continues at a rapid pace. Theoretically, limitations to quality wine production can be traced from bottle price ceilings to what wineries can pay growers for their best fruit. This is a vinous example of the trickle down theory of economics. The economics of wine production roll downward from what the consumer pays for a bottle of wine, unless other unrelated sources of capital are available. As an example, at \$1,800 per ton for Pennsylvania Cabernet Sauvignon, no one here is getting rich growing grapes. Likewise the wineries, unable to charge much more than \$30 a bottle for their best reds, are limited in the price they can pay for grapes, thereby restricting what the grower can do in the vineyard. In this business, money equals choices, which translate to quality. It is hoped that market realities will change as wine quality improves. **wbm**

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