

Adapted from; Borchgrevink, Carl and Ron Perry. 2011. Wine and Other Hospitality Beverages, Great Rivers Technology, Dubuque, IA ISBN 978-1-61549-184-1 (Online). Electronic textbook.

Title: Michigan

Name: Text: Chapter 16

Situated in the upper Midwest, Michigan enjoys the unique advantage of being a large peninsula surrounded by four of the five Great Lakes, totaling 38,575 square miles of land covered by water area. It is the eighth most populous U.S. state and has the longest freshwater shoreline of any political region in the world (3,288 miles) (Michigan in Brief, Michigan.gov).

Approximately 50 percent of the state's land is covered with over 19 million acres of forests, two-thirds of which is birch, aspen, and oak, representing the fifth-largest timberland acreage in the United States.

Michigan is separated by two peninsulas, the Upper and Lower Peninsulas. Most of the forested land and wildlife resides in the Upper Peninsula and most of the intense farming and population is located in the Lower Peninsula. Michigan is second only to California in diversification of its agricultural commodities and industries.



Lake Michigan near Arcadia

Table 1. Total grape tonnage (1,000 tons) produced over three years of the top seven U.S. states

State	2008	2009	2010
California	6,548.0	6,544.0	6,350.0
Washington	350.0	381.0	370.0
New York	172.0	133.0	170.0
Michigan	73.7	96.5	45.0
Pennsylvania	107.2	64.0	80.0
Oregon	34.7	40.2	40.0
Ohio	5.7	5.7	3.8

Source (Adapted from): <http://www.nass.usda.gov/>

The state ranks first nationally in the production of three types of dry beans: black, cranberry, and small red; as well as blueberries, tart cherries, pickling cucumbers, and flowering plants impatiens and geraniums. Other important commodities include beans and wheat; principal field crops are oats, hay, corn, rye, potatoes, soybeans, and sugar beets. The state is a major producer of apples, plums, grapes, carrots, sweet cherries, fresh-market and processing vegetables, and it long has been a ([major supplier of spearmint](#)). Michigan supports

approximately 125,860 acres of fruit (2003), and about 14,500 acres of grapes of which 2,700 acres are dedicated to wine and the remainder for juice production. Michigan ranks in the top 10 states in the nation for both grape and wine grape production (Table 16.1 and 16.2).

Table 2. Wine production by state for the top 13 states (2009)

State	Gallons (in thousands)
California	634,384
New York	26,258
Washington	23,757
Oregon	6,418
Kentucky	1,993
Florida	1,871
New Jersey	1,712
Michigan	1,270
North Carolina	1,232
Virginia	1,162
Ohio	1,103
Missouri	1,034
Pennsylvania	816

Source: <http://www.ttb.gov/statistics/2009>

The Michigan wine industry is relatively small, but the economic impact of the [tourism](#)



[Tourists enjoying wine tasting at Black Star Winery tasting room and winery near Suttons Bay, MI](#)-oriented industry is great at nearly \$300 million and, when combined with juice grapes, is estimated at over \$790 million per year (MKF Research Study, 2005). The

Michigan wine industry is made up of 90 wineries as of 2012(www.michiganwines.com). The majority of these wineries are small, producing fewer than 5,000 cases (Table 16.3).

Table 3. Michigan winery size (2007)

Winery Size	Number of wineries	Volume (Cases)
Largest wineries	4	50,000 - 100,000
Mid-sized wineries	4	10,000 - 50,000
Small wineries	4	5,000 - 10,000
Smallest wineries	44	< 5,000

Data provided by Michigan Liquor Control Commission, based on taxes paid in 2007. L Jones, MGWIC

History in Brief

1679 French explorers made wine from *Vitis riparia* wild grapes.

- **Mid-1800s** Viable wine industry is established with vineyards and eight wineries in Monroe County. None survived Prohibition.
- **1880** Southwest Michigan's wine industry begins with Concord grapes as backbone.
- **1919** The opening of a Welch's plant in Lawton, near Paw Paw, helps the area's grape growers survive Prohibition.

- **1936** Post-Prohibition; two wine companies survive: St. Julian Wine Company and Warner Vineyards (Paw Paw) .
 - Sweet and fortified wines are made and marketed by Michigan wineries through late 1960s, peaking at 2.3 million gallons (slightly short of 1 million cases) in the early 1960s.•
- **1937** Ponchartrain Wine Cellars, Detroit, invents Cold Duck.
 - Blended sparkling wine with Burgundy table wine.
- **1943** Bronte Champagnes and Wine Company established in Hartford.
 - **1956** First French Hybrids used to make table wines.
 - **1964** Cold Duck becomes best-selling product. Ernest Gallo begins making a competitive similar product, becoming “André” product.
- **1969** Consumption of drier table wines surpasses sweet and fortified wines. Consumer tastes in the Midwest and East change from sweet.
- **1970** Research and variety evaluation begins by Professor G. Stanley Howell, Dept. of Horticulture, Michigan State University.
- **1970** Tabor Hill opens as the first new Michigan winery after the repeal of Prohibition; it bases its products on table wines made with French Hybrids.
- **1975** Chateau Grand Traverse, Ed O’Keefe, becomes the first to plant Riesling V. *Vinifera* plants for commercial vineyard in Old Mission Peninsula, Traverse City.
- **1976** Bernie Rink, Boskydel Winery, Leelanau becomes the first northern commercial winery and vineyard to open based on French Hybrids.
- **1981** Fennville (Fenn Valley winery and vineyards) is the first Michigan AVA established.
- **1985** Michigan Grape and Wine Industry Council is established by the MDA.
 - 15 wineries, 10,500 acres of grapes, 875 acres are dedicated to wine production.
- **2005** MGWIC commissions Economic Impact Study by MLK Research declaring that the full economic impact of grapes and wine on the state is \$790 million (\$503 million juice/ \$287 million wine).
- **2012** Michigan lists 90 commercial wineries, 14,600 acres of grapes, greater than 2,700 acres dedicated to wine, 1.27 million gallons produced.

Climate and Grape Varieties

Name: Text: Chapter 16

Thanks to Dr. Paolo Sabbatini, Assistant Professor, Dept. of Horticulture, Michigan State University for co-authoring this segment of this chapter.

Michigan has a cool-cold climate with growing seasons in the four AVAs (Fennville, Lake Michigan Shore, Leelanau and Old Mission Peninsula). Cool and cold is defined as a cool growing region that limits fruit ripening (growing season length averaging between 165 days in northwest Michigan and 180 days in southwest Michigan). Additionally, low temperature injury that can damage or kill vines over winter. In many respects, the climate and viticulture is similar to Austria, Germany and Burgundy. Michigan wines are produced in a typically cool climate, resulting in clean, crisp, balanced wines that exhibit real varietal character. Similar to the products of Germany, the white and sparkling wine products are praised more frequently than red wines. As in Germany, Michigan wine makers are challenged in making heavy tannin, high alcohol, and highly colored red wines, frequently associated with warm regions like Spain in Europe and California in the U.S. Despite this characteristic, wine makers have steadily produced excellent quality red wines with unique wine chemistries and character, especially with cool-climate red varieties like Pinot Noir, Cabernet Franc, Lemberger, Chambourcin, and Chancellor.

Michigan wines have won numerous medals at prestigious competitions each year. More than 16 percent of the wines entered in the state wine competition had already won gold medals in regional, national, and international competitions. Michigan tends to be cloudy with minimum and maximum temperatures moderated by Lake Michigan and Lake Huron. Michigan has a continental climate with three distinct regions. The Upper Peninsula has a more severe climate with short growing seasons (as low as 60 days), and cold to very cold winters. The southern and central parts of the Lower Peninsula (south of Saginaw Bay and from the Grand Rapids area southward) has a warmer climate with hot summers and cold winters. The northern part of the Lower Peninsula and the entire Upper Peninsula has a more severe climate, with warm, but shorter summers and longer, cold to very cold winters. There is a concentration of vineyards and wineries in close proximity, within 25 miles, of the Lake Michigan shoreline where temperatures rarely dip below 0°F in the winter. Vineyards are insulated and protected by “lake-effect-snow,” which also retards bud break in spring to help avoid spring frost damage, and extends the



Tart cherry orchard in spring in full bloom, Lake Michigan shore line in background.



Vineyard of Chateau Grand Traverse in close proximity to Lake Michigan shore on Old Mission Peninsula

growing season by up to four weeks. In northern Michigan, fruit orchards and vineyards manage to prolong bud dormancy in the spring, avoiding spring frost injury of blossoms and new shoot growth with ice lingering in the bays along the Lake Michigan shoreline. While global warming is helping to increase the heat units (Growing Degree Days or GDD) in Michigan, ice accumulation along the shorelines is not remaining, reducing the cooling effects on buds. Michigan averages from 30 to 40 inches (76 to 100 cm) of rainfall annually.



Evans Riesling vineyard in foreground in an old cherry orchard site and in close proximity to cherry and apple orchard blocks (background), Benzie County, Michigan

Michigan is a leader in the Midwest and the East in fruit and grape production due primarily to its geography regarding proximity to the Lake Michigan shoreline. The state can grow the many tender fruit crops that surrounding Midwestern states can't. In fact, Michigan finds it possible to not only grow such tender crops as sweet cherries, apricots, and tart cherries, but also *Vitis vinifera* varieties which are typically susceptible to winter injury. *Vitis vinifera* varieties such as Chardonnay, Riesling (the most widely planted white), Pinot Noir (the most widely planted red), Pinot Grigio/Gris and Cabernet Franc are considered hallmark varieties in wine marketing and value, and thereby drive planning and site selection. Today, about 65 percent of Michigan's wine grapes are *Vinifera*, and since 1997, these varieties make up 90 percent of the new plantings

in the state. When considering wine grape growing in Michigan and in New York, growers must account for midwinter low temperatures. Table 4 provides guidelines for the various grape varieties and what can be grown related to the risk of midwinter temperatures. This knowledge helps delineate the areas in the state according to risk. In reviewing midwinter temperatures over 20 years, researchers identified areas within the **25-mile distance in proximity to Lake Michigan with having the fewest episodes below -4°F** (<http://www.grapes.msu.edu/weather.htm>). Actual risk is dependent on characteristics of a site related to topography, aspect, and vineyard management.

**Table 5. Wine grape variety
acreage (2006)**

Wine Grape Variety	Acres (in thousands)
Cabernet Franc	85
Chardonnay	195
Merlot	60
Pinot Grigio/Gris	115
Pinot Noir	135
Riesling	340
Seyval	75
Vidal Blanc	145
Vignoles	85
Other	495

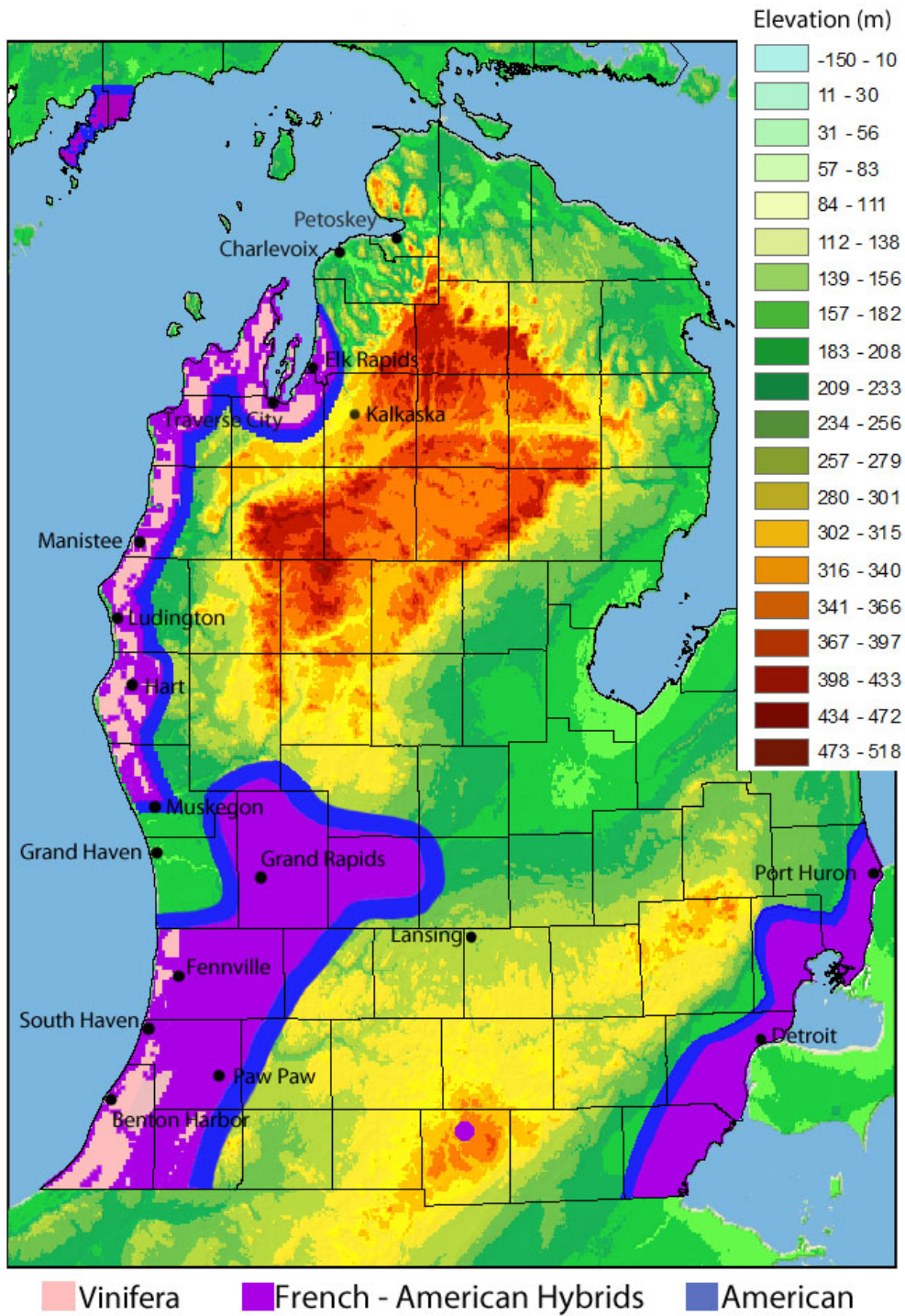
*Source: Adapted from USDA
NASS Statistics
(<http://www.nass.usda.gov/>
Fruit Rotational Survey
Michigan).*

Table 4. Relative cold hardiness of various grape varieties*

Cold Hardiness Class	Range of Critical Low Temperatures (degrees F)**	Species	Example of Varieties
Very Tender	5° to - 5°	Most <i>Vitis rotundifolia</i>	Carlos, Cowart, Scuppernong, Supreme
Tender	0° to - 5°	Most <i>Vitis vinifera</i>	Chenin Blanc, Merlot, Semillon, Sauvignon Blanc, Zinfandel, Sangiovese, (Rhone varieties; Viognier, Cinsault, Syrah, etc.)
Moderately Tender	0° to - 10°	Most <i>Vitis vinifera</i>	Chardonnay, Cabernet Sauvignon, Gewurztraminer, Pinot Grigio, Gamay Noir, Muscat Ottonel
Slightly Hardy	- 10° to - 15°	Some <i>Vitis vinifera</i> Some hybrids	Riesling, Cabernet Franc, Lemberger, Pinot Noir, Chambourcin, Vidal
Moderately Hardy	- 10° to - 20°	Most hybrids	Cayuga White, Chardonel, Traminette, Seyval Blanc, Vignoles, Chardonel
Hardy	- 15° to - 25°	Most <i>Vitis labrusca</i>	Catawba, Concord, Delaware, Niagara, DeChaunac, Chancellor
Very hardy	- 20° to - 35°	Minnesota hybrids	Brianna, Frontenac, Frontenac Gris, Foch, LaCrescent, Marquette, Leon Millot, LaCrosse, St.Croix

* From Dami, I., B. Bordelon, D. Ferree, M. Brown, M. Ellis, R. Williams, and D. Doohan. 2005. Midwest Grape Production Guide. Ohio State University, Bull. 919. and

** Temp that will kill 50% of primary buds, LT50. Expressed as a range as it varies with varieties, season, environment and cultural practices.



The Michigan Grape Growing Map

The attached map of Michigan delineates wine grape growing regions associated with establishment of commercial wine grape varieties. The map is authored by Ron Perry, Paolo Sabbatini and James Burns, Department of Horticulture, Michigan State University. Delineations in mapping are based primarily on low midwinter temperature data (Pollyea, Kurtz and Aichele, retrieved Aug 15, 2011 from <http://www.grapes.msu.edu/climateWinter.htm>) and historical experiences and research (variety trials) related to grape and fruit growing in the state. Note that wineries and vineyards exist in many areas of Michigan, within and outside of the described zones depicted in this map (see <http://www.michiganwines.com/page.php?menu=maps>).

Grape Varieties

Super Hardy Hybrids. Minnesota and Wisconsin varieties such as Frontenac, LaCrescent, St. Croix, Louise Swenson, among others (many areas in Michigan).

American Hybrids. Genetically dominated by native species such as *V. labrusca* and *V. aestivalis*, *V. riparia*, and more, developed by American breeders such as Ephraim Bull, T. V. Munson, and others in the 1800s. Many varieties were developed such as Catawba, Norton, Delaware, Niagara, and Concord, used for wine and juice production and today make up about 3 percent of Michigan's wine.

French American Hybrids. Older cultivars developed in France using species native to America, which were crossed with *Vinifera* cultivars to increase cold tolerance and resistance to pests (Vidal, Seyval, Chambourcin, Foch, etc.). These varieties make up about 35 percent of Michigan's wine grapes, and are referred to as French Hybrids. They became important in the eastern United States in the mid-1900s, producing acceptable quality wine with consistent productivity and pest resistance. Contemporary breeding programs exist in America (NYAES, Geneva) and in Europe, with the goal of improved wine quality and vineyard performance (Cayuga White, Carot Noir, Traminette, Chardone, etc.).

Vinifera Varieties. Chardonnay, Riesling, and more. (Limited to areas with best sites). The quest to plant *Vinifera*s continues to grow in Michigan due primarily to market demand and perceived superior wine quality. *Vinifera*s make up about 65 percent of Michigan's wine grapes and since 1997, 90 percent of the new plantings in Michigan. Within the *Vitis vinifera* varieties, the more cold hardy varieties have gained the most success in survival and fruit production. Many of the most cold tender varieties, often found originating in hot or warm districts in Europe, struggle to survive in the long term. Secondly, many of these same varieties require considerable heat units and long growing seasons that Michigan can't consistently provide.]

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Among the groups of varieties, the **Super Cold Hardy** varieties are comprised primarily of Minnesota and Wisconsin hybrids which can be grown without much concern for vine death and crop loss (withstanding spring frost) in most areas in Michigan. Planting on elevated sites with respect to surrounding land surface (minimum of 15-20 feet) can assure growers with the greatest success.

The commercial growing of varieties other than the **Super Cold Hardy**, are more limited regarding recommended growing regions for commercial production. While even the more cold tender Vinifera varieties can be grown anywhere in Michigan with specific vineyard management techniques. In cold areas, growers must bury vines and critical components (canes and trunks) prior to winter under soil or mulch in order to reduce chances of mortality due to midwinter low temperatures (Zabadal, et. al., 2007). That process includes removal of the soil or mulch by winter's end. Commercial vineyards have been established in the four AVAs with a very long history of success. The long history of tree fruit growing in Michigan and an analysis of the macro- and meso- climate¹ can help determine and suggest variety selection. Commercial tree fruit production often requires sites with well drained soils, infrequent spring frosts and adequate elevation differential. Apples and pears are the most cold hardy and least limited by site, while successful peach, sour and sweet cherry production must have exceptional sites in close proximity to the Lake Michigan or Lake Huron shoreline. In evaluating regions based on climate and proximity to the Lake Michigan shoreline, areas with low elevation found in association with watersheds such as the river systems of Manistee, Grand, Muskegon, White, Pere Marquette, etc., are limited to cold hardy American and Super Cold Hardy varieties.

[Side bar: Macro- and Meso- Climate. The macro-climate of a vineyard depends on regional climate, mainly influenced by geographical location (latitude). The meso-climate is the specific climate of the vineyard or of the site chosen for a new planting and it is influenced by several topographical characteristics as elevation, slope and proximity to large bodies of water that can moderate the temperature. Another important climatic factor is called micro-climate. This is the climate close to the vines. It is very important because it determines important vine physiological characteristics such as leaf and fruit exposure to sunlight that impact fruit ripening and disease infection.

Vinifera Varieties. In general, Vinifera varieties can be grown within 6 miles (10 kilometers) of the Lake Michigan shoreline as long as there is adequate differential elevation. Lake Michigan averages 175 meters (574 feet) above sea level. The areas identified or colored in pink within this zone have the most potential as determined by elevations registered at least 15 meters (49 ft) above Lake Michigan. The eastern limit (inland from the shoreline) is dependent on latitude in Michigan with increased distance in the south compared to the north. In all cases, the preferred slope-aspect, as in most viticultural regions, is west to southwest exposure (highest heat accumulation). Look for former or current cherry and peach orchard sites as prime sites. If a cropping history is not available, it will be pivotal to obtain weather data from a close weather station (www.agweather.geo.msu.edu/mawn) or with some portable data-loggers.

- South of Grand Haven, areas identified / colored in pink are above 623 feet (190 meters) within 6 miles from shoreline, 656 feet (200 meters) within 12 miles and 820 feet (250 meters) within 25 miles. Therefore, vineyard sites marginally acceptable to grow **Slightly cold hardy** Viniferas (see Table 4) must be established at higher elevations as the distance increases beyond 6 miles, up to a maximum of 25 miles from the shoreline. One winery, Domaine Berrien Cellars, has had success in growing **Tender** Vinifera Rhone varieties on a high protected site near Berrien Springs.
- Oceana and Mason Counties. Only **Slightly cold hardy** Vinifera varieties (Table 4) are recommended within 6 miles of the Lake Michigan shoreline, providing the site has elevation differential of at least 25-50 feet over the surrounding topography. The pink colored zone begins at a minimum of 656 feet (200 meters) above sea level. Six miles is the definitive most eastern limit in growing these varieties in these counties. French and American hybrids provide less risk and assurance of longer term survival and production in these counties.
- Manistee, Benzie, Grand Traverse and Antrim counties (north of Oceana and Mason counties) host a number of commercial vineyards and wineries. The northern limit is estimated about 6-10 miles north of Elk Rapids. The pink colored zone begins at a minimum of 656 feet (200 meters) above sea level. Elevation with respect to surrounding land-surface is highly desirable and recommended. Vinifera varieties can be grown up to the 6 mile eastern limit of the Lake Michigan shoreline. **Moderately tender** and **Tender** Vinifera varieties (Table 4) can be grown as long as the site has excellent elevation (some sites on Leelanau and Old Mission Peninsula).

French and American Hybrids. These varieties as a general group can be grown within the pink and purple colored zones with an eastern limit, approximately 8 miles of the Lake Michigan shoreline. These varieties can be grown inland from the Lake Michigan shoreline where sites have a long history of successful stone (peach, cherry and plum) and some pome fruit (apple and pear) growing. These areas include, Clarksville/Ionia, Romeo, Port Huron (moderated by Lake Huron) Deerfield, Lansing (MSU Hort Research Farm, over 30 years experience) and the Garden Peninsula in the Upper Peninsula. Other areas not colored also have potential but must be established on sites with good elevation with respect to the surrounding topography. The best sites have a history of commercially growing peach and cherry. Some **Moderately Hardy** French Hybrid varieties such as Chancellor can adapt to areas in southern Michigan as long as the site has some good elevation differential. Look to **Hardy** hybrids where apples have dominated history in the area rather than stone fruit.

American varieties. **Cold hardy** varieties such as Concord and Niagara can be grown in the pink, purple and blue colored zones. The center of the juice grape industry, based on these two varieties, is found in Lawton, some 25 miles east of the Lake Michigan shoreline. The most reliable sites are free of frost, found on high sites because these juice grape varieties grow early in the spring. Flat or low sites (so called "frost pockets") should be avoided.

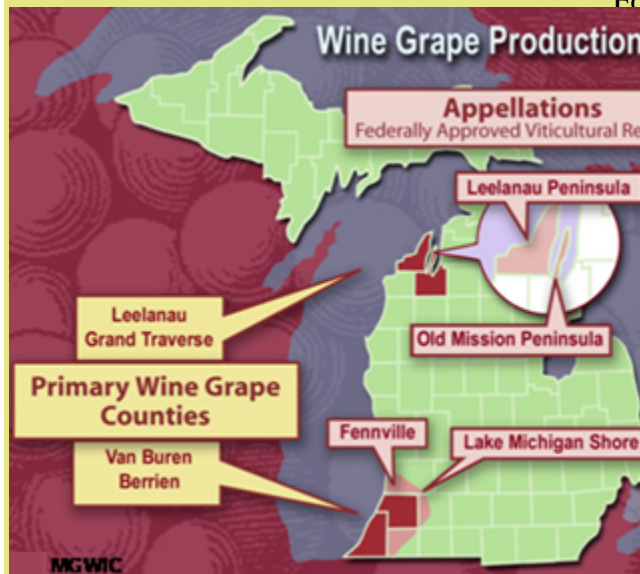


Regions of Michigan Wine Production

Name: Text: Chapter 16

Michigan has **four** American Viticultural Areas (AVAs). Fennville, Allegan County, in southwest Michigan was the first one established in 1981 and has only one vineyard and winery, “Fenn Valley.” The Fennville AVA is a sub AVA now of Lake Michigan Shore AVA. Therefore, the Lake Michigan Shore (includes Allegan, Berrien and Van Buren Counties) in Southwest Michigan, Old Mission Peninsula (Grand Traverse County) and Leelanau Peninsula (Leelanau County), both in northwest Michigan. The two AVAs in southwest Michigan have growing season averaging 160 days and an average heat accumulation of 2,750 growing degree days, producing 45 percent of the state’s wine. The two AVAs in northern Michigan average about 145 days growing season length and an average heat accumulation of 2,350 growing degree days producing 51 percent of Michigan’s wine grapes (Michigan Grape and Wine Industry Fast Facts). The federally approved AVAs should not be confused with Michigan wine trails.

Growing Degree Days. Amerine and Winkler established California wine regions in the 1930s based on heat accumulation from April 1 through October (see the chapter on California). The calculation is accomplished by estimating the growing degree days (GDD) for each day (daily max + daily min) / 2 – 50 and totaling the GDD for the entire season. According to this calculation, areas in Michigan equate to North Coast California; San Luis Obispo, California; Champagne, France; and Mosel, Germany.



Wine Trails.

Four associations of wine trails have organized themselves with the help of the Michigan Grape and Wine Industry Council (MGWIC). The trails serve to help promote wineries and their products through media, pamphlets, newspaper and magazine articles, maps and help organize various tourism events and festivals. The trails include [Lake Michigan Shore Wine Trail](#) (Fennville and Lake Michigan Shore AVA); [Southeast Michigan Pioneer Wine Trail](#) (wineries in south central and east Michigan); [Wineries of Old Mission Peninsula and Leelanau Peninsula Wine Trail](#) (respective AVAs).

The wineries included in the Southeast Michigan Pioneer Wine Trail association have not received approval as of this writing for approval as a separate AVA by the TTB.

Title: Soils and Sites**Name: Text: Chapter 16.5**

Soil conditions are less limiting related to vineyard establishment than climate and associated topography. As stated earlier, climate, meso or micro, “trumps all” factors. A casual observation of vineyard regions in the world notes that the best vineyards, producing the best quality wines, are often found not in bottom, flat valleys but on the slopes of hills or ridges above these areas. Soils in Michigan were formed as a result of glacial action which deposited unsorted materials within and under glacial ice in the last ice age. Glacial till soils lack typical solid and structured bedrock as found in most agricultural soils. The material is comprised of a heterogeneous mixture of particle sizes from rocks to clay. Basal tills left by glacial retreat formed drumlins and moraines which characteristically have dense restrictive layers that inhibit water movement and root penetration. These hard pans can occur on hills (drumlin or moraine), which perches water and floods root systems. When it comes to vineyard (fruit) sites, those that possess elevation changes and slope are not only helpful in cold air drainage, they often can be beneficial to relieve soil drainage. Topography can make it possible to be able to grow certain cold sensitive varieties. It is critical that sites are chosen which have elevation higher than the surrounding landscape. As mentioned earlier in this chapter, the more successful long term vineyard sites are high. Look for former or current cherry and peach orchard sites as prime sites. Soils in northern Michigan vineyards are typically coarse and underlain by lime deposits deep in the C horizon. These soils commonly lack Cation Exchange Capacity and do not readily retain nutrients and water, making drought stress common if the fruit site is not irrigated. Soils in southern Michigan vary from coarse sandy soils found nearest the Lake Michigan shoreline to heavy clay soils with relatively shallow topsoils over clay sub soils.

Varieties for Michigan, New York, and the Midwest

Chapter 16

A discussion about varieties is not complete without a consideration of marketplace demand, even in the eastern United States. The marketplace is still dominated internationally as well as locally by *Vinifera* varietal products. The climate in Michigan allows for the planting of *Vinifera* varieties, but not without risk to winter injury. This option does not exist outside of Michigan in good sites along the Lake Michigan shoreline, good sites along the New York Finger Lakes, and on Long Island in New York. Remember that even for these areas, risk still exists. In late February 2004, vineyards in northern Michigan were devastated when temperatures dropped to –16°F at a time when vines were becoming active in preparation for bud break. Woody structures (trunks and cordon arms) of *Vinifera* vines were killed or severely damaged and crops for 2004 were reduced by 85 percent depending on the site. The episode taught everyone the importance of site selection, especially for tender *Vinifera* varieties.

It is these kinds of experiences that suggest that French and American Hybrids still have a critical place in the variety arsenal, even in the warmest areas of Michigan and New York. Variety testing continues to be an important area of work in Michigan by researchers at Michigan State University (MSU) and at Cornell University at Geneva and Ithaca. Additionally, the breeding programs conducted by the USDA and Cornell scientists at the Geneva Experiment Station and the University of Minnesota will continue to be critical for providing new genetic material for vineyards in the midwestern and eastern United States. Even though hybrids from French and American programs have lost their prominence as varietals (label names) in the marketplace, they are the backbone to wineries in making popular proprietary blends. Traminette, a white wine hybrid grape released by the Geneva Experiment Station, New York, is continuing to show tremendous potential as a varietal and in proprietary blends in Michigan, New York, Indiana, Ohio, and Pennsylvania (see description below). In fact, St. Julian Wine Company, Paw Paw, Michigan, won Best of Class Semi-Dry White Wines in the Michigan State Wine Competition in 2009. Cayuga White, another hybrid developed and released at Geneva, New York, continues to be extremely important in providing aromatic Muscat-like juice for semi-dry to sweet table wine and sparkling blends. Older hybrids, developed in France in the early part of the 20th century, continue to be important in Michigan and New York as noted in the list of Michigan variety acreage in Table 5. These varieties helped launch and continue to sustain a successful sparkling wine business for Larry Mawby Wine Company, especially for his L. Mawby brand. The French and the American hybrids expand and extend vineyard production into regions further interior from the Lake Michigan shoreline such as the Southeast Michigan Pioneer Wine Trail and other traditional fruit (orchard) growing areas (see map in previous discussion).

Discussion on hybrids also has to include the Super Hardy Hybrids and crosses made at the University of Minnesota. Wine varieties such as Frontenac (red) and La Crescent (white) make it possible to develop vineyards in cold areas including interior regions of the Lower Peninsula and some areas in the Upper Peninsula. A proprietary blend made with a high proportion of juice from Frontenac was awarded Best of Class Red Wine in the 2008 Michigan State Wine Competition by a Michigan wine company, 45 N Winery.



Concord

American Hybrids

Concord. Concord dominates acreage and importance in Michigan due to its dual role for making juice and wine, both sold in Michigan and out of state. According to the 2006 Michigan vineyard survey, there were 9,350 acres, or 64 percent of the total 14,600 acres of grapes in Michigan. The predominant use by far for this grape is juice grape production. This grape variety was a seedling found by Effram Bull in 1843 in Concord, Massachusetts. It is thought to be a natural *Vitis labrusca* hybrid with Catawba. Concord is cold hardy and moderately resistant to diseases. Concord was important to the Michigan and New York wineries in the early 20th century in making sweet and fortified wines. Wineries began using French Hybrids and *Vinifera* varieties in the 1970s and got away from dependency on this variety. Midwestern wineries still buy grapes from Michigan for their wine products. St. Julian has followed their popular semi-sweet product, “Blue Heron”, with “Red Heron” made with Concord.



Niagra

Niagara. The Niagara, a white juice/wine variety originated in 1868 in Lockport, New York, which is situated in Niagara county, hence the name Niagara. Niagara is the second-most planted variety to its parent Concord (as of 2006 at 3,250 acres in Michigan). Niagara is less cold hardy and pest resistant than Concord and has difficulty with heavy soils. Niagara is largely used for making white juice products but has historically been an important wine variety. In the 1970s and 1980s in the Finger Lakes region of New York, two large companies, the Taylor Wine Company and Widmers Wine Cellars produced large volumes of Niagara wine. Those wines were sold throughout the country (Zabadal, et al., 2009).

French American Hybrids



Seyval



Vidal



Vignole

Seyval. Seyval, also known as Seyval blanc (SV 5-276) is a hybrid white wine grape variety suited to cool climates. It is an important variety in Michigan and the New York Finger Lakes region. Wines made with Seyval have citrus flavors and aromas and are often oak aged and subjected to ML. Seyval is the third-most widely grown white hybrid in Michigan with 75 acres planted as of the 2006 survey of vineyards in Michigan and used commonly in blends and is relatively cold hardy. It is highly susceptible to *Botrytis* fruit rots and its tendency to over-crop.

Vidal. Vidal, also called Vidal Blanc or Vidal 256, is a very popular white hybrid variety planted in Michigan, New York, and Ontario, Canada. This variety has proven to be among the most versatile in North American viticulture. It has earned the VQA, Canadian superior status among all other French American Hybrids. It makes up nearly 25 percent of the 14,000 acres of vineyard in Niagara Peninsula appellation in Ontario. A large proportion of these grapes go into making the appellation's most popular and hallmark product, Ice Wine. Vidal is one of

the commercially successful hybrid products of prolific French (Bordeaux) hybridizer Albert Seibel (1844–1936). Vidal is the most widely planted white variety in Michigan with 145 acres as of the 2006 vineyard survey. It is moderately hardy, productive, and late ripening, making it attractive for use in making Ice Wine. Fruit clusters may hang on the vine quite well late into the fall and winter.

Vignoles. Vignoles, (pronounced Vee-NYOLE) also known as Ravat 51, is another popular white French Hybrid with 85 acres planted in Michigan, according to the Michigan 2006 vineyard survey. It originated from a cross between Siebel 6905 and Pinot de Corton made by J. F. Ravat in France in circa 1930 and was released in 1970 by the Finger Lakes Winer Growers Association. Vignoles is relatively hardy, ripens mid-season, and has wonderful fruit quality that makes excellent wines semi-dry to sweet and late harvest. Clusters are compact and susceptible to fruit rots before fully mature.

Chambourcin. Chambourcin, or JS 26-205 continues as the most popular of all the red French Hybrids planted in Michigan (42 acres in the Michigan 2006 survey) and eastern North America. Red wines made from this variety have won many awards in midwestern and eastern U.S. wine competitions, especially when oak barrel aged. Chambourcin must be planted on good sites due to winter hardiness shortcomings. Vines must be thinned because of the plant's tendency to over-crop. A proprietary blend made by Fenn Valley Vineyards called "Capriccio" won the Best Dry Red award at the 2011 Michigan Wine and Spirits Competition (<http://www.michiganwines.com/page.php?menu=awards>) which is made up of 84% Chambourcin blended with Cabernet Franc and Cabernet Sauvignon.



Chancellor

Chancellor. Chancellor, also called Seibel 7053, S.7053, is a French Hybrid red wine grape developed by Albert Seibel about 1850. Like Chambourcin, it is a very popular variety in the Midwest and eastern United States and accounted for 35 acres of vineyard in Michigan as of 2006. Chancellor is cold hardy and late ripening but subject to early fall freezes and must be planted on good sites. Red wines made with this variety are of good quality, especially when barrel aged but must be thinned in the vineyard to maintain fruit quality.



Foch

Foch. Foch, also known as Marechal Foch, is a French Hybrid red wine grape variety, named after the French marshal Ferdinand Foch (1851–1929), who played an important role in the negotiation of the armistice terms during the closing of the First World War. The variety was developed in Alsace, France, by grape hybridizer Eugene Kuhlmann. Foch is cold hardy, disease resistant, and ripens early. It is the most widely planted red French Hybrid in the 2006 Michigan vineyard survey with 47 acres. Wines are light in color and tannins, similar to Pinot Noir.



Traminette

Traminette. Traminette is the result of a cross between French American Hybrid "J.S. 23.416" and the *Vitis vinifera* Gewürztraminer made by Herb Barrett at the University of Illinois, Urbana/Champaign. After taking a grape breeding position at Cornell Geneva Exp. Station, he released the selection as a variety with fruit having Gewurztraminer-like aromatics and flavors. The variety is more productive, cold hardy, and pest resistant than the Vinifera parent.

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