



Wine Grape Varieties for Michigan

A white rectangular graphic tilted at an angle, containing text and a small image of purple grapes. The graphic has a black border.

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Cover photo: Merlot grown on a Scott Henry training system at the Mike and Sandy Nitz farm near Baroda, Mich.



Introduction

The past 25 years have been marked by major growth and major changes in grape production for wine in Michigan. There has been change in the geographic area involved in commercial wine production and a revolution in the grape varieties chosen for wine production. That revolution continues. Twenty-five years ago, the most important wine varieties grown in Michigan were Concord, Niagara and Delaware, and the wine style was heavily weighted to dessert types. In 1990, less than 5 percent of Michigan wines were made from these varieties, and the predominant wine styles were dry white and dry red table wines. This revolution was the result of planting a range of new varieties, and new variety evaluation

and acceptance by Michigan's wine industry will continue to be a major factor in the industry's improvement in wine quality, production economics, and respect in the national and international wine community. It is crucial that both new and traditional varieties be carefully evaluated under Michigan conditions.

The grape varieties that perform best under Michigan conditions must possess a range of desirable characteristics. First and foremost, a variety must produce quality wine. Second, it must possess the genetic ability to adapt to the climate and soils of the state and, while doing so, produce consistent commercial levels of economically realistic production.

Environmental Limitations

Winter cold

Varieties vary considerably in their ability to withstand cold winter temperatures. Hardiness is a complex genetic characteristic of each variety that is influenced by vine conditions during the previous growing season — crop load, canopy management, pest control, date of harvest and leaf loss, general vine health, etc. Vine hardiness level is also influenced by the weather during the dormant season. Successful viticulture requires that the variety be adapted to the variable conditions of freeze and thaw unique to the region (macroclimate) as well as the site (mesoclimate).

Spring frost

Varieties with adequate hardiness may be susceptible to spring frost. Varieties that begin growth early in the spring are particularly susceptible to frost and may prove unacceptable commercially because of the high probability of crop loss due to frost.

Growing season length

Some hardy, frost-tolerant or late-bursting varieties cannot be grown in a particular area because they require a long and/or warm growing season to achieve the desired level of fruit quality and/or production. Therefore, some important later ripening varieties are limited to the warmest regions of the state. Careful matching of variety to macroclimate and mesoclimate is crucial.



Michigan's Climate

the most critical factor in achieving varietal character. The varieties listed below are those with which the authors have had direct experience in Michigan. Other varieties are being currently evaluated or evaluation is planned. Our goal here is to provide the reader with an up-to-date statement of our current understanding and to encourage readers to avail themselves of the

most recent data that may be found in the annual reports of the Michigan Grape and Wine Industry Council (MGWIC), the Southwest Michigan Research and Extension Center (SWMREC), the Northwest Horticultural Research Station (NHRS) and the Clarksville Horticultural Experiment Station (CHES).

Variety Trials and Selection

Variety evaluation plots have been maintained by the Michigan State University Agricultural Experiment Station over the past 28 years. The goal has been to assess genotypic adaptation to the climate and soils, susceptibility to pests (see Table 1, p. 22), vine yield, fruit composition, ease of culture and, most importantly, wine quality. Nearly every variety that has become important in Michigan's wine quality improvement revolution resulted from such a Michigan variety trial. Another less often considered benefit of such trials is the rejection of varieties

deemed unsuitable for Michigan as a result of maladaptation or poor wine quality. It is easy to quantify the benefit of a newly selected variety for the industry. One can measure increased acres, increased gallons of wine, improved market share or industry profitability. It is much more difficult to quantify the value of data that say do not plant that variety. We include a list of varieties at the end of the bulletin that have been evaluated and should not be planted in Michigan. We submit that such data are also very valuable.

Varieties

The three general categories of grape varieties being grown for wine in Michigan are: *labrusca*, which are varieties with genetic and species background in *Vitis labruscana*; *vinifera*, which are derived from *Vitis vinifera*, the native grapes of the Mideast and Europe; and mixed-species varieties, which have genetic contributions from *V. vinifera* and one or more native American species (*V. riparia*, *V. rupestris*, *V. aestivalis*, *V. linccumii*, *V. longii*, etc.). (*V. labruscana* and the strong varietal flavors associated with that species were not used in the production of the mixed-species varieties.) Incorporating genes from native American species increased varietal resistance to insect and dis-

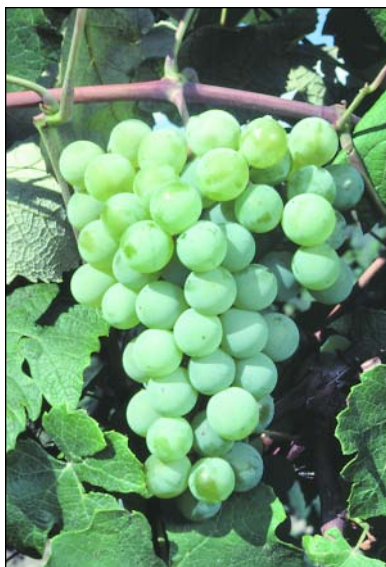
ease attack and increased cold hardiness (compared with the *V. vinifera* parent). For these reasons, European viticulturists are now more often referring to these varieties as "resistant varieties" rather than the former, pejorative term "hybrids" as a result of their efforts to reduce pesticide inputs into their wine grape culture.

Labrusca varieties

A significant reduction has occurred in the culture of *V. labruscana*-based varieties grown for wine in Michigan, and only two are being used.



Varieties



Niagara

Niagara is a white variety that produces wines of strong varietal aroma and flavor. It is also used in the production of dessert wines (dry and cream sherry). It ripens about 10 to 14 days before Concord.

Strengths. It has a long history of culture in Michigan and is adapted to the climate and soils. Culture is nearly 100 percent

mechanized, including pruning and harvest. The quality of the cream sherry produced is excellent.

Weaknesses. Strong flavor limits the market for white table wine. The market for cream sherry is low compared with that for table wines of similar quality. These market concerns suggest caution and a careful assessment of grape prices, production levels and production costs before considering plantings of Niagara for wine production.

Concord is used for the narrow market of sweet, flavorful red wines often marketed as kosher wines. It is late ripening, which limits production to southwest Michigan, where growing seasons exceed 165 days and heat units (expressed as growing degree-days [GDD] at base 50 degrees F) are 2,700 to 3,100.

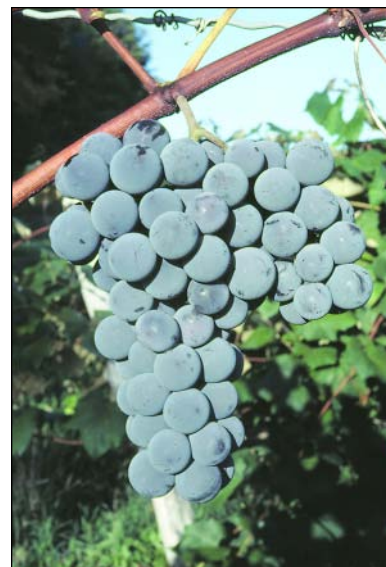
Strengths. It has been cultured in Michigan for more than 100 years and is clearly adapted to the climate and soils. It is very cold hardy. The culture is nearly 100 percent mechanized.

Weaknesses.

Demand for Concord wine is in severe decline. Early bud burst results in spring frost hazard and puts the crop at risk. The variety is not recommended for future wine grape plantings.

Other Labrusca varieties were grown for wine in Michigan's past.

Only two, Delaware and Catawba, were grown to any extent. Both are now seldom seen, and planting them for wine is not recommended.



Concord

Mixed-species resistant varieties

This second group of Michigan wine grapes has been variously called "French hybrids," "French-American hybrids," "American hybrids" and, most recently, "resistant varieties." In Michigan, we are fortunate that genes for improved cold hardiness were also incorporated. The history of these varieties and market response to them has been varied. Early varieties released by French breeders produced wines of marginal quality and did much damage to the concept that genetic improvement could be used as a means of solving the inadequacies of the *V. vinifera* parent. Continued breeding efforts employing superior *vinifera* varieties back-crossed to first- and second-generation interspecific varieties or selections have resulted in a number of varieties capable of producing high quality wines. In addition, the breeding efforts of Einset and Reisch at Cornell University and Moore at the



Varieties

University of Arkansas, combined with the efforts of Alleweldt, Eibach and Becker in Germany and Hungarian breeders, continue to breed grapevines resistant to disease and insect attack that also possess the capacity to produce fine wines. We have formal relationships with Dr. Reisch at Cornell University and Drs. Alleweldt and Eibach at Geilweilerhof in the German Rhinepfalz that allow us to evaluate their advanced selections and patented varieties in Michigan variety trials.

White wine varieties

Aurore was an early selection among the inter-specific varieties for planting in Michigan.

Strengths. Aurore is early ripening and is very cold hardy. The vine has good vigor and is productive under Michigan conditions, producing large, slender clusters of green-yellow berries.

Weaknesses. The berries are thin-skinned and prone to split when exposed to rainfall prior to full ripeness. It is very susceptible to black rot. The wines have been described as herbaceous and thin. Aurore is not recommended for commercial planting in Michigan. Aurore acreage is in decline.



Aurore

Cayuga White, formerly GW-3, was named by Cornell University in the early 1970s. It is similar in leaf and growth characteristics to *Vitis labruscana* varieties.

Strengths. It is hardy and productive, and the wines are pleasant and Germanic in style when the fruit is harvested prior to full ripeness.

Weaknesses. Wines from fully ripened Cayuga White grown in Michigan have had a strong labruscana character and lacked refinement. Great care in choice of fruit maturity for harvest is required. There has been only limited interest in Cayuga White because of the early experiences with overripe fruit. It should be reevaluated.



Cayuga White

Chardonel, formerly NY-45010 and GW-9, was named in 1990 by Cornell University, in part because of its superior performance in Michigan and Arkansas. It is the result of a cross between Seyval, a complex, mixed-species cultivar, and Chardonnay. Its wines reflect the qualities of the two parents. It is a late mid-season ripener in Michigan, ripening a little later than Seyval. Chardonel has performed well, there is winery interest, and we expect to see more of the variety in production.

Strengths. It has a moderately sized cluster and, unlike Seyval, requires no crop thinning to achieve growth:yield balance. Clusters are less compact than those of either parent, so Chardonel is less susceptible to harvest season bunch rot complex. It is a good pro-



Varieties

ducer (5 to 8 tons/acre) on standard, single-curtain, high-cordon training, and the fruit composition commonly has been nearly ideal (20 to 23 °Brix; pH 3.25 to 3.35; TA 7.5 to 8.5g/l), even at the higher level of cropping. Chardonal has the potential for fine quality dry still wines produced with barrel fermentation and/or barrel aging, and also as a component in the cuvees for method champenoise sparkling wines.

Weaknesses. It is less hardy than Seyval, and when grown on soils with high water content, it has been susceptible to crown gall. Information from Virginia suggests that the vines are very susceptible to grape root borer.

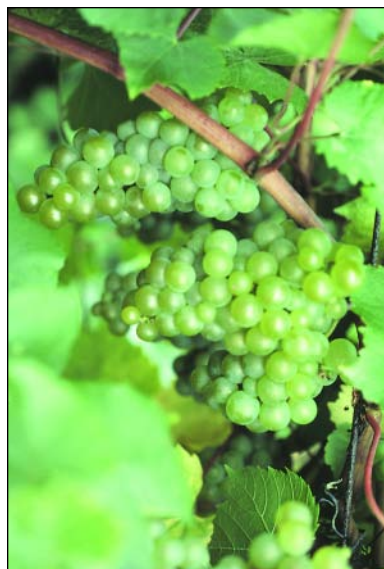


Horizon

Horizon is a white wine variety released by Cornell University in 1982. It has not performed well in Michigan and we cannot recommend its planting.

Strengths. The vine is productive and cold hardy. New York data suggest that it has potential as a bulk white wine producer because it ripens with low fruit acidity.

Weaknesses. The wine produced from Michigan-grown grapes has been characterless except in certain years when labrusca character could be perceived. It is also susceptible to harvest season cluster rot complex.



Melody

Melody is also a release by Cornell University. We have grown it in trials for seven years and the wine has been only fair.

Strengths. It is cold hardy and disease resistant, producing moderate yields of 4 to 7 tons/acre.

Weaknesses. It is very late ripening, and wine quality has been only fair. In southwest Michigan, it has had a ripening

season similar to that of Cabernet Sauvignon. We cannot recommend it.

Seyval blanc is one of the standard white wine varieties of Michigan. It is also one of the most widely planted varieties in the eastern United States. The vine is of moderate to low vigor, producing large, compact clusters. Crop control is a key for the successful culture of Seyval. Wine quality is good, and the grape can be used for several wine styles.



Seyval blanc



Varieties

Strengths. Seyval has good hardiness when cropped properly and is a consistent midseason producer. The wine is clean and fresh and can be finished either fresh and dry, barrel fermented with malolactic fermentation and *sur lie* aged wine as with Chardonnay, or as a part of a sparkling wine cuvee. It greatly benefits from grafting to a vigor-inducing rootstock. We anticipate that Seyval will remain an important white wine variety for the foreseeable future.

Weaknesses. Requires crop adjustment via cluster thinning in addition to pruning in the dormant season. Clusters are very susceptible to harvest season cluster rot complex. This can be reduced by cluster thinning 2 to 4 weeks after fruit set.



Traminette

Traminette resulted from a cross of Joannes Seyve 23.416 and Gewurztraminer. It was released by the New York Agricultural Experiment Station in 1996 after more than 20 years of testing in New York. It has been grown in Michigan in trials at the SWMREC since 1988. The vines are grafted to 3309-C rootstock, are very vigorous and

require a divided canopy (e.g., Geneva Double Curtain) trellis to adequately distribute foliage and to expose fruit. Traminette vines are capable of producing large crops that ripen near the end of the season in southwestern Michigan. Wine quality is excellent and is nearly identical to that of Gewurztraminer. The vines are more cold hardy than Gewurztraminer but not as hardy as other hybrids such as Seyval.

Strengths. Traminette is moderately cold hardy and produces large crops of excellent quality fruit. The wine is surprisingly similar to Gewurztraminer.

Weaknesses. It is very vigorous and requires proper canopy management to ripen fruit adequately. Fruit matures with Vidal blanc and Chambourcin, so it will have potential only for southern Michigan. Reports from New York indicate that vines suffer from winter damage to trunks, especially on heavier soils.

Vidal blanc has been a major variety in Michigan for 25 years. It is a vigorous variety with long, loose clusters. It is late ripening and suited only for the regions with a long, warm season to ensure adequate fruit maturity. The wines produced can be quite versatile, ranging from off-dry Germanic-style wines to dry, barrel-fermented table wines. It has also been used to produce fine quality ice wines.



Vidal blanc

Strengths. It is a consistent producer and is capable of producing a commercial crop even when all buds on canes retained at pruning have been winter killed. It has moderate cold hardiness. The cluster is loose and the berries are thick-skinned, so there is seldom any harvest season cluster rot complex. Vidal blanc is late budding, with almost never a loss due to spring frost. It is a consistent producer, it is easy to grow, and we believe that it will remain an important variety for Michigan.



Varieties

Weaknesses. Some cluster thinning is required as a crop adjustment to avoid overcropping. Best flavors are produced at something less than full maturity. Wines that have been produced from grapes at 22+ °Brix have had off-flavors. Overripe flavors lack finesse.

Vignoles (Ravat-51) has been a major wine variety for 25 years. It is a moderately low vigor vine with small, tight clusters. The wine styles for Vignoles are varied, depending on the region where the grapes are grown. In the northern region, the style is often a dry, barrel-fermented, *sur lie* aged wine or a sparkling wine cuvee. Most



Vignoles

commonly, however, Vignoles is produced as an off-dry wine or as a dessert wine when the *Botrytis* infection occurs as a so-called "noble rot" and produces a dehydrated, sugar concentrated fruit. It is very cold hardy, more so than either Seyval or Vidal blanc.

Strengths. Vignoles is very cold hardy and produces high quality wines. It does not require any crop adjustment by cluster thinning. It has broad adaptation to all the wine-producing regions of Michigan.

Weaknesses. Small, compact clusters are very susceptible to harvest season cluster rot complex. Vine yield is also low to moderate because of low bud fruitfulness.

Red wine varieties

Baco Noir (Baco No. 1) has been a part of the wine grape scene in Michigan for at least 40 years. It is very vigorous and produces small, tight clusters. It ripens in midseason and produces wines that have been variously described as "Rhone-style" or "Beaujolais-style". Wine of Baco Noir can be very good when well ripened fruit are vinified with good cellar technique. Similarly, it can be harsh and very acidic when either of these qualifications is not met. It has married well in red wine blends, and this will likely be the variety's future usage in Michigan.

Strengths. It is very vigorous and can be a big producer when grown on heavier soils. It is somewhat resistant to downy mildew, *Botrytis* and *Phomopsis* infections, and it is moderately cold hardy.

Weaknesses. Variable wine quality has led to reduced valuation of Baco Noir as a quality wine producer. It is also very susceptible to black rot and crown gall. The latter is especially a problem on heavy, water-retaining soils. The tight cluster of the variety also makes it susceptible to harvest season cluster rot complex. It also is characterized by high titratable acidity at fruit maturity. We expect the acreage of Baco Noir to decline in favor of other varieties.

Cascade (Seibel 13053) was planted to a small extent during the late 1960s and early 1970s in Michigan.

Strengths. Cascade is cold hardy and early ripening. The loose cluster seldom has a problem with cluster rots. It has performed well in blends.

Weaknesses. The variety produces wine that is very simple and has little to commend it. The acreage of Cascade has declined in recent years, and we expect that decline to continue.



Rejected Varieties

Some of the following varieties have been discussed in the material presented above and their specific inadequacies explained. The listing of the additional varieties is based on almost 30 years of effort in Michigan, and their rejection is due to our assessment that they produce poor quality wines. Some of these are close calls—the senior author admits to a fondness for well made Baco Noir that is not broadly shared—and others represent progress as a new variety supplants a lesser quality or less well adapted variety. This latter is based as much on the realities of industrywide perspectives as on our critical view. Some of these wines possess qualities that would fit well in locations with less amenable climate and would also do well in home winemakers' vineyards because of their superior cold hardiness. We designate such varieties with (HW).

Rejected varieties

All <i>Vitis labruscana</i> varieties	Landal
Aurore (HW)	Landot noir (HW)
Cascade (HW)	Villiard blanc
Chelois (HW)	Villiard noir
Colobel	Ravat blanc
Dechaunac (HW)	Florental
Horizon (HW)	Veeport
Melody	Ventura
Joffre (HW)	Verdelet
Neron	Rayon d'Or (S. 4986) (HW)
Pinard	



Grape Rootstock Varieties

All grape varieties of *V. vinifera* require grafting because of their susceptibility to the grape root aphid, *Phylloxera*. *Phylloxera* is native to North America, and grapevine species from our continent have evolved mechanisms of resistance to this pest over the millennia that the vine and the insect have coexisted. Readers interested in more information and detail on *Phylloxera* and the historical development of grape rootstocks and their usage are encouraged to peruse the references listed below.

Early rootstock usage employed selections from certain species; the rootstocks Riparia Gloire (*V. riparia*) and Rupestris St. George (*V. rupestris*) are examples. Because many important European vineyards were grown on high-pH soils and both of the above stocks are intolerant of high lime, interspecific hybridization was used, first with *V. riparia* and *V. rupestris* with the high-pH-tolerant *V. vinifera*, and later with the very lime-tolerant *V. berlandieri*. Table 2 (p. 23) is a breakdown of important rootstocks and information on their species background and special resistance and vine growth characteristics.

Michigan experience with the broad array of rootstocks is lacking. To date, we have had the following rootstocks under evaluation for 10 years or more: Riparia Gloire, Rupestris St. George, 5-BB, SO-4, 3309C, 1613C, 1202C and Harmony. Additional experience has been gained by comparing 3309C and 101-14 Mgt in Swiss viticulture. In the course of our efforts, we have found no rootstock superior to 3309C in its performance. Having said that, we strongly encourage Michigan vineyardists to avoid planting extensive monocultures of single rootstocks. Recent history and a simple understanding of selection pressure in a population of organisms both suggest the wisdom of using several rootstocks in our plantings.

The choices we have found acceptable vary with soils and conditions of culture. The choices for low vigor-inducing sandy soils would include 5-BB, 3309C, SO-4, 101-14 Mgt, 1616C and Riparia Gloire. Clearly, this is not an exclusive list. We have either minimal or no Michigan experience with the Paulsen, Ruggeri, Richter and Millardet rootstocks. These data will come as our time and experience allow.

Additional Reading

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Tables

Table 1. Relative resistance of grapes grown for wine in Michigan to winter freeze damage, disease attack, *Phylloxera* and sulfur-induced leaf damage.*

Variety	Winter freeze damage	Spring frost	Black rot	Downy mildew	Harvest season <i>Botrytis</i>	<i>Phomopsis</i>	Crown gall	<i>Phylloxera</i>	Sulfur damage
Aurore	9	6	1	5	2	8	9	8	No
Baco Noir	6	1	1	9	8	8	6	10	No
Cabernet Franc	4	10	1	2	8	3	4	1	No
Cabernet Sauvignon	3	10	1	2	8	2	2	1	No
Cascade	7	6	8	9	9	5	2	8	No
Cayuga White	8	4	9	5	8	8	8	8	No
Chambourcin	6	9	1	6	8	-	7	6	Yes
Chancellor	7	7	8	1	6	3	5	8	Yes
Chardonel	7	7	7	6	8	-	5	8	No
Chardonnay	3	4	5	2	2	2	2	1	No
Chelois	8	4	1	9	8	3	6	2	No
Colobel	6	2	3	9	8	-	-	-	-
Concord	10	2	1	9	9	8	8	8	Yes
DeChaunac	10	3	9	5	10	5	7	9	Yes
Gewurztraminer	2	6	1	1	3	-	2	1	No
Horizon	9	5	-	9	2	-	9	8	No
Leon Millot	10	1	6	9	9	-	8	8	?
Limberger	3	8	1	2	8	-	4	1	No
Marechal Foch	10	1	6	9	4	7	8	4	Yes
Melody	8	6	1	4	8	-	-	-	No
Merlot	2	6	5	1	2	2	1	1	No
Muller-Thurgau	2	6	3	1	3	-	2	1	No
Muscat Ottonel	3	8	1	1	5	-	2	1	No
Nebbiolo	1	10	2	1	6	-	2	1	No
Niagara	8	4	1	1	9	2	4	10	No
Ortega	4	7	4	2	8	-	4	1	No
Pinot blanc	2	5	1	1	2	-	2	1	No
Pinot gris	2	5	1	1	2	-	2	1	No
Pinot meunier	3	5	1	1	2	-	2	1	No
Pinot noir	2	5	1	1	2	-	2	1	No
Riesling	4	8	1	1	2	5	9	1	No
Rougeon	10	3	5	10	6	-	9	9	Yes
Sauvignon blanc	1	8	1	10	10	-	2	1	No
Scheurebe	4	8	3	8	6	-	4	1	No
Seyval	8	8	1	6	1	8	7	4	No
Vidal blanc	7	10	8	6	9	9	7	10	No
Vignoles	9	8	8	6	1	6	8	8	No

*The conditions are ranked 1 - 10, with 1 = most susceptible and 10 = most resistant.



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