Grape Cultivars for Minnesota

Selecting grape cultivars to plant is important and can be the difference between a successful vineyard and one destine to failure. There a number of factors that must be taken into consideration in selecting the cultivars that best meet your needs.

1. What are your marketing plans? Will you be growing grapes for wine, juice and jelly, fresh table consumption, or some combination of these options? Some cultivars are specific for wine making, while others have multiple uses.
2. Is the cultivar adapted to your climatic conditions?
    a. Does it possess sufficient cold hardiness? Cold hardiness of grapevines can be reported as minimum temperature the vine can survive, or the temperature at which primary cane buds begin to exhibit winter injury. The cane buds are the tenderest portion of a grapevine and because injury to these buds affects cropping potential it is a more important consideration when selecting cultivars to plant.
    b. Is the length of your growing season and accumulated growing degree days (GDD) sufficient to properly mature the fruit? Grape cultivars are classified by their season of maturity, with approximate maturity date being influenced by the regional and local growing conditions (GDD). Ideally, the growing season should be long enough to mature the grapes and allow the vines to acclimate for the winter before the first killing frost.
    c. What is the potential for a spring frost? Grape cultivars break bud at different times in the spring with cultivars such as La Crescent and Marquette being very early compared to Prairie Star or Frontenac. Early bud-breaking cultivars should be planted on the least frost-prone sites of your property.
3. How marketable is the cultivar? Marketability is reflected by demand for the grapes and higher prices paid. Once a vineyard is in production, is costs about the same to grow grapes that are in high demand as it does to grow those in low demand.
4. How productive is the cultivar and does it have any issues that can affect productivity? Cultivars differ in their production potential with Frontenac being a productive cultivar while St. Pepin has low production potential. Some cultivars such as La Crescent are prone to pre-harvest berry drop (shelling).
5. Does the cultivar exhibit good disease and pest resistance? Disease and pest control can be a major expense in an established vineyard. If a cultivar exhibits good resistance to some of the major diseases and pests, a grower may be able to cut back on some pesticides or extend the time between sprays.
6. Does the cultivar exhibit sensitivity to any chemicals? Grapevine sensitivity to sulfur or copper fungicides can be an issue, particularly if you are considering organic production. Sensitivity to 2,4-D, dicamba, and other growth regulator herbicide drift is an issue for vineyards in areas where these herbicides are commonly used, and significant exposure to one of the products could mean the loss of the crop and maybe death of sensitive grapevines.

When considering what grape cultivars to grow in Minnesota and other cold climates, there are four groups to select from:

1. **Northern hybrids** - These are a new class of cold hardy grape hybrids based on *Vitis riparia* that were bred for cold climates and are redrawing the boundaries of viticulture in North America. The Swenson hybrids were bred with our conditions in mind by Elmer Swenson of Osceola, Wisconsin. The University of Minnesota has an active grape-breeding program. University of Minnesota grape breeder, Peter Hemstad and fruit breeding project leader, Jim Luby are credited with the release of four successful winter hardy cultivars. The University of Minnesota Enology Project, is exploring methods to make quality wines from these grapes. For more information on the University of Minnesota grape breeding program, visit www.grapes.umn.edu. The USDA Specialty Crops Research Initiative (SCRI) Northern Grapes Project (http://northerngrapesproject.org) is also evaluating cultural and winemaking practices to improve the quality of wines made from northern grapes and marketing them.

2. **French-American hybrids** - are interspecific hybrids of *V. vinifera* with several native American wild species (*V. labrusca, V. lincecumii, V. riparia, V. rupestris, V. aestivalis*). Some of them have excellent fruit quality, though they are not yet as well-known as Cabernet Sauvignon, Chardonnay or other famed European cultivars. They were bred to impart resistance to the root form of grape phylloxera into European cultivars. In general, they are better adapted to northern climates than the pure *V. vinifera* grapes of Europe and make sound, often outstanding wines. However, French-American hybrids (often referred to as French hybrids) were bred for French conditions, so winter hardiness is only an accidental characteristic. Maréchal Foch, for example, seems to tolerate most of our winters uncovered, at least in southern Minnesota.
3. **American cultivars** - are the old standard cultivars of eastern North American grape growing areas based on *V. labrusca* cultivars and hybrids. Most famous of these would be Concord, Niagara, Delaware and Worden. There are many others. Most of them are marginal in our cold climate. Hardy ones with some *V. riparia* parentage, that include many of the Swenson hybrids, have been listed in the Northern hybrid group.
4. ***Vitis vinifera* cultivars** - famed in Europe and California, are the most susceptible to damage from low winter temperatures. They require extra care and attention and need to be covered in winter for cold injury protection. Even so, some early cultivars bear and ripen well. If you would like to try growing *V. vinifera*, choose early-ripening cultivars.

Leaf characteristics will aid in identifying some of these hybrids. American cultivars characteristically have thick leathery leaves that are pubescent (fuzzy) on the undersides. *Vitis vinifera* cultivars and wild *V. riparia* vines have leaves that are more glabrous (shinny) with no pubescence on the undersides. The hybrids vary in these leaf characteristics depending on the percentage of *V. labrusca* to *V. vinifera* and *V. riparia* parentage is present in the cross. Some Swenson hybrids based on *V. riparia* x *V. labrusca* crosses have somewhat leathery leaves with some pubescence on the underside, while Northern hybrids that are primarily *V. vinifera* x *V. riparia* crosses have leaves more characteristic of *V. vinifera* cultivars.

The follow section provides descriptions the various grape cultivars suitable for growing in Minnesota and other cold climates. **Table 21** (at the end of the section) lists some of the cultural characteristics grape cultivars, while **Table 22** rates their susceptibility to common grape diseases, sensitivity to sulfur and copper sprays, and growth regulator herbicide drift.

NORTHERN HYBRIDS:

WHITE WINE

AROMELLA (NY 76.0844.24) – (also known as NY 76) Introduced by Cornell University in 2013. Considered hardy, but very prone to growth regulator herbicide drift injury. Vines are vigorous, with semi-procumbent growth habit. Clusters are medium-sized and loose. Grapes mature mid-season; prone to shelling when mature. Wines are aromatic with notes of pineapple, honeysuckle, citrus peel and floral Muscat characters.

BRIANNA (ES 7-4-76) – Cross includes *V. labrusca* and *V. riparia* parentage. This white cultivar, a cross of Kay Gray with ES 2-12-13 was named by Ed Swanson at Cuthills Vineyard. The vine is very cold hardy and shows good fungal resistance. Growers in Nebraska claim it ripens late August - early September and have listed no bud damage to -28° F. White, medium sized clusters and berries that produce nice pineapple aroma and flavor in the wine and can also be used as a table grape.

EDELWEISS (ES 40) – Cross includes *V. riparia* by *V. labrusca* parentage. A very early maturing, white grape that has fairly good hardiness in southern Minnesota. Clusters are medium to large, sometimes weighing a pound or more.

Berries are medium in size and very juicy. The flavor is pleasant as the grape matures but becomes very strong when dead ripe. Harvested just prior to full maturity (i.e. 14-16 brix), Edelweiss makes a delightful fruity white wine.

FRONTENAC GRIS (MN 1187) – A color mutation of the mother Frontenac vine at the University of Minnesota Research Station at Excelsior. This vine is identical culturally to the original red Frontenac (see Frontenac description below). However, the berries ripen to a bronze rather than red and produce a white or salmon tinged white wine. The wine is clean and crisp with an apricot or peach flavor, and is best finished slightly sweet. It can also be used to produce an ice-style wine that is usually salmon or peach colored with pronounced flavors of apricot or peach.

FRONTENAC BLANC – A colorless mutation of Frontenac and Frontenac gris that was independently found by several growers in Minnesota and Canada that has become known as Frontenac blanc. Like Frontenac gris, the vine appears culturally identical to Frontenac. Unlike Frontenac gris, Frontenac blanc makes a true white wine. Initial trial vinifications indicate that Frontenac blanc produces wines that are distinctly different form Frontenac gris in flavor and aroma.

KAY GRAY (ES 1-63) – Cross includes *V. labrusca* and *V. riparia* parentage. Vigorous vine is cold hardy and disease resistant. Medium sized white grapes mature in late August. Cluster is small and compact with one small shoulder. Berries are juicy and bland with low acidity. Kay Gray is best for wine under the following conditions: The grapes must be harvested prior to full maturity (15.5 Brix is ideal), the juice treated with bentonite to remove objectionable aromatics, and then cool fermented, with care taken to prevent malolactic fermentation. Kay Gray musts are extremely susceptible to oxidation. Precautions to avoid oxidation include a minimal amount of racking, and the use of CO^2 whenever the juice, must or wine is to be exposed to air.

LA CRESCENT (MN 1166) – Cross includes 45% *V. vinifera, 28% V. riparia,* and less than 10% each of *V. rupestris, V. labrusca,* and *V. aestivalis* parentage. This white wine cultivar, a cross between St. Pepin and ES 6-8-25. Vines are very vigorous, reliably cold hardy and productive. It is regarded as reliable in the Twin City area. Growth habit is sprawling and drooping (procumbent). The vine is moderately resistant to powdery mildew and black rot, but is quite susceptible to both foliar phylloxera and downy mildew (on the leaves only) so a good spray regimen is required to keep this vine healthy. Bud break is early, similar to Maréchal Foch, and ripening is mid-season, similar to Seyval Blanc. Clusters are somewhat loose and berries are round, yellow-amber when ripe, fairly small, and prone to shelling. When made dry the wine is rather austere and can be overly acidic, but when finished sweet, delicious melon, citrus, pineapple, tropical fruit and lychee flavors emerge. Wines lack strong herbaceous aromas or those associated with V. *labrusca*.

LA CROSSE (ES 294) – Cross includes *V. labrusca; V. lincecumii; V. riparia; V. rupestris; V. vinifera* parentage. White cultivar of medium size, ripening shortly before Seyval, one of its parents. Juice composition is similar to Seyval but tends to lack character. Vines are considered to be cold hardy, and very vigorous with a semi-upright growth habit. Shoots produce few tendrils and tend to lay down in VSP training systems. Susceptible to black rot, moderately susceptible to downy mildew and powdery mildew. Medium sized, tight clusters with thin skinned berries; prone to sour rot. Vines fruit best in Minnesota when grown with winter protection.

LOUISE SWENSON (ES 4-8-33) – Cross includes *V. labrusca* and *V. riparia* parentage. This extremely cold hardy white wine grape has shown itself to be very reliable well north of the Twin City area. It is of only moderate vigor and bearing capacity. However, it has good disease resistance and few cultural problems. Sugar levels are usually less than 20% and the wine is very light with honey flavors and beautiful flowery aromas. It is best as a quality element when blended with wines of more body like Prairie Star, Lacrosse or Seyval.

PETIT AMI™ (DM 8313.1) – Cross includes *V. vinifera, V. riparia* parentage. A white wine cultivar developed and patented by David MacGregor as Petite Amie in 2007 and later trademarked. Hardy to very hardy grapevine with low to moderately vigor and a procumbent growth habit. Blooms mid-season and can produce up to four small to medium sized clusters per shoot. Exhibits moderate to good disease resistance, but can susceptible to black rot in wet years. Leaves can be prone to the muscat speckle (spot), a physiological disorder. Wines have a fine muscat flavor.

PRAIRIE STAR (ES 3-24-7) – Cross includes *V. vinifera, V. rupestris, V. labrusca, V. aestivalis* parentage. A vigorous, upright growing white wine grape with good disease resistance and reliable cold hardiness. It ripens in mid-season with excellent body and sugar/acid balance. It imparts body and balance to blended wines and was originally released as a blending cultivar but has been seen to produce very creditable varietal wines as well. Canes are fragile and break off easily when training or in high wind. Does best on the VSP Trellis. Berry set is an issue when rain occurs during bloom.

ST. PEPIN (ES 282) – Cross includes *V. labrusca, V. lincecumii, V. riparia, V. rupestris* and *V. vinifera* parentage. White sister seedling of La Crosse but pistillate (requires cross-pollination). Earlier, fruitier, slightly less hardy, blends well with La Crosse to make a very nice German style wine. Also makes an outstanding juice. Good disease resistance. Low to moderately productive.

RED WINE

BETA – Cross includes *V. labrusca, V. riparia* and *V. vinifera* parentage. Originated by Louis Suelter in central Minnesota in the late 19th century by crossing a wild *V. riparia* with Concord. This blue grape is very hardy, vigorous and disease resistant. It generally pushes buds around April 15th and can be harvested the second week in September. It has medium sized acidic fruit and is best suited for making jelly. Considered hardy as it has little or no winter damage in a typical Minnesota winter.

BLUEBELL – Cross includes *V. labrusca* and V. *riparia.* An old University of Minnesota introduction that almost disappeared but is now being planted again. It is a high quality Concord style (*V. riparia* x *V. labrusca*), seeded eating cultivar, makes good fresh juice, and is finding a place as a red wine grape as well. In the southern part of the state it is fully cold hardy, reliable and very disease resistant. In western Minnesota it sometimes does poorly due to the high pH of the soils. Ripens early to mid-season.

FRONTENAC (MN 1047) – Cross includes *V. vinifera* and *V. riparia*. Introduced by the University of Minnesota in 1996, this cultivar quickly rose to popularity in Minnesota. A cross between *V. riparia* 89 and the French hybrid Landot 4511, this is a very cold hardy vine, and has borne a full crop after -30° F. Good resistance to powdery mildew and near-immunity to downy. Very susceptible to foliar phylloxera. Small black berries on medium to large clusters that are usually slightly loose. Berry splitting and bunch rot have been rare, even in wet years. Frontenac has been a consistently heavy producer and sometimes requires cluster thinning. In Minnesota it ripens in late-midseason, about 10 days after Foch. Although sugar levels rise very early, it is important to let the fruit hang long enough to fully mature in order to reduce the acidity to workable levels. Fortunately, the pH does not often rise to dangerous levels. Brix of 24-25° is not uncommon. Versatile grape for wine making. When made as red wine, it typically has a pleasant cherry aroma with berry and plum evident in many cases. Herbaceous characters are almost entirely absent. The color is usually a garnet red, but can become excessively dark with long periods of skin time. Can be made into an attractive rosé usually with a bright red color and cherry flavors. Has produced excellent port-style desert wines. Malolactic fermentation is essential to reduce the wine's high acidity. Tannin levels are usually relatively low.

GENEVA RED (NY 34791) – (also known as Geneva Red 7, GR 7) Introduced by Cornell University in 2003. Cross includes *V. labrusca, V. riparia, and V. vinifera* parentage. Considered a hardy, early to mid-season maturing blue cultivar (in ISU trials, up to a 3 week difference in maturity between southern and northern sites was observed). Vines are very vigorous with a semi-procumbent growth habit; best suited to a GDC training system; requires basal shoot and lateral shoot thinning. Clusters are medium-sized and tight. Grapes are relatively low in acids. Wines are medium to dark red with notes of cherry or red berry aromas in warm years; some *labrusca* notes in cool years.

HASANKY SLADKY – (also known as Baltica or Kazan Early) is a cross of Dalnyvostochyni #60 with *V. amurensis*. It is hardy to approximately -31° F (-35° C). This blue grape has long, slightly loose clusters with small-medium berries. The juice is clear, not red. It is best suited to light red "cafe" wines. The wines are quite fruity, with

some nice tannins in the mouth and with no hint of foxiness. The wine is remindful of a Beaujolais nouveau. In cool climates, the acidity tends to be high and has to be reduced with malolactic fermentation. In the vineyard, it is quite disease resistant, except for a moderate susceptibility to powdery mildew. It has perfect flowers.

KING OF THE NORTH – An extremely hardy blue *V. riparia* by *V. labrusca* hybrid grape excellent for wine, juice, or jelly. The vine is hardy to -37° F, very vigorous and productive with some susceptibility to downy mildew. Medium sized loose clusters of medium berries are juicy but remain tart, late into September. Very popular in other areas as a wine cultivar producing a rich, aromatic and grapey, labrusca-style red wine. Good for grape juice, jelly and tart eating this grape is of unknown origin but appears to be a labrusca-riparia hybrid, similar to but better quality than Beta. According to tests done in Wisconsin, King of the North was hardier than Beta.

MARQUETTE (MN 1211) – Introduced in 2006 from the University of Minnesota, Marquette originated from a cross between MN 1094 and the French hybrid Ravat 262, which has Pinot noir as one parent (includes *V. riparia, V. vinifera* and other *Vitis* species). Resistance to common grape diseases (downy mildew, powdery mildew and black rot), has been good and the vine requires only a minimal spray program. Infestation by foliar phylloxera has been moderate but less than Frontenac. Growth habit is moderately upward, open and orderly. Vine vigor appears to be site specific ranging from very vigorous on optimum range soil pH to moderately vigorous on higher pH soils. Shoots typically have two small to medium-sized clusters per shoot, thus avoiding the need for cluster thinning. Bud break is early, similar to La Crescent, and tends to bear lightly. Acid levels are lower than Frontenac, and harvest °Brix of 23-25 are not uncommon. Marquette typically produces complex red wines with V. vinifera-like color, moderate tannins, and notes of cherry, black currant, raspberry, and black pepper with no hybrid characters. In some tastings it has been rated better than pure *V. vinifera* wines.

PETITE PEARL – A red wine release from the work of Tom Plocher of Hugo, MN, a cross of MN1094 and ES4-7-26. Extremely cold hardy, reliable, and while late maturing is able to ripen reliably in the Minneapolis/St. Paul Area. The vine offers good tannins and low acids, quite rare in northern hybrids. The clusters are small and compact, vine exhibits a trailing or drooping growth habit and has been very disease resistant. The vine does not appear to be a heavy bearing but its combination of low acidity and notable tannins make it a promising new grape for the region.

SABREVOIS (ES2-1-9) – Cross includes *V. labrusca* and V. *riparia*. This sister seedling to St. Croix is an extremely vigorous growing, very disease resistant red wine cultivar that is already popular in Quebec. It seems less prone to root injury in snowless winters than its sister St. Croix. It needs a large trellis like a Munson or GDC to deal with its extreme vigor. It produces a powerful and often complex red wine that is valuable in blending and seems amendable to carbonic maceration. Fully cold hardy, ripens mid-season.

ST. CROIX (ES 242) – A popular red *V. riparia* by *V. labrusca* hybrid wine cultivar in Minnesota. Winter hardiness has been variable but is roughly similar to Foch. Grafting on a hardy rootstock such as Suelter is beneficial as this vine has been seen to suffer dramatic, even fatal root injury in snowless winters. Produces medium-sized, tight clusters with soft, thin-skinned berries. Sugar varies depending on pounds per vine. Acid very low. Color, size of berries very similar to Beta in appearance. Juice is pale rose. Maturity is mid-September. Vines are extremely vigorous with a trailing growth habit, best grown on a GDC or Munson training system. Excellent fruity wines have been made from St. Croix by fermenting a portion of the must using carbonic maceration techniques.

SUELTER – Like its sister seedling Beta, this cultivar was developed a century ago by Louis Suelter in Carver County. It is a cross of *V. riparia* by Concord (*V. labrusca*) and has characteristics of both. Suelter is very cold hardy and disease resistant. Its berries are medium-large on medium sized loose clusters and ripen 3-4 weeks before Concord. Rather high acid level, but lower than Beta. Also, in contrast to Beta, tends to have more *riparia* as opposed to *labrusca* flavor. Makes excellent jelly. Unlike Beta, Suelter is pistillate and requires cross-pollination. This extremely vigorous cultivar can be grown almost anywhere in our region.

VALIANT – A *V. labrusca* x *riparia* hybrid from South Dakota State University. This vine is productive and is the

hardiest known cultivar, hardier than Beta or King of the North. Unfortunately it is extremely susceptible to downy mildew and black rot. Clusters are small but well filled. The black fruit ripens very early and is much lower in acid than Beta. The berries are too small for fresh eating, but it makes excellent fresh juice or jelly and some wineries value it as a wine cultivar especially for port-style red wines.

TABLE CULTIVARS

MARS (Arkansas 1508) – (also known as Mars Seedless) Released from the University of Arkansas table grape breeding program in 1984. Cross includes *V. labrusca* and *V. vinifera* parentage. Buds are rated hardy, and most hardy of the American seedless table grape cultivars. Berries are large and round, and transition from a mahogany to deep blue/black during the harvest season which can extent for almost 3 weeks and lends well to the farmers market trade. Matures early to mid-season. Average cluster weight in ISU trials was .35 lbs. Vines are very vigorous with a procumbent growth habit, best suited for Munson or GDC training systems. Vines are productive and unlike other American seedless table grapes, productivity on secondary buds is good. Cluster thinning at bloom is recommended. Vines exhibit very good resistance to the common grape diseases. Suitable for growing areas suited for Edelweiss.

SWENSON RED (ES 439) – Cross includes *V. labrusca and V. riparia* parentage. A very high quality red seeded table grape. Clusters are medium to large and quite compact. Berries are large with thin edible skins. The flesh is "meaty" like a good California table grape, and the flavor is fruity but without *labrusca* flavors". Can be cold pressed into an acceptable white wine. The grapes also keep very well in cold storage. Two faults of this cultivar are that it is quite susceptible to downy mildew and is not hardy enough to fruit reliably in most of Minnesota without winter protection.

SOMERSET SEEDLESS (ES 12-7-98) – Cross includes *V. labrusca, V. riparia, V. vinifera* and other small amounts of American *Vitis* species. A pink to red seedless cultivar of medium sized berries on small to medium loose clusters. It is extremely early, ripening in August in Minnesota, most seasons. It is a very handsome, juicy and delicious eating cultivar but is only moderately cold hardy although probably the hardiest of the seedless grapes now available.

SUMMERSWEET (ES5-4-35) – Cross includes *V. labrusca* and *V. riparia* parentage. An extremely hardy blue seeded table grapes both early ripening and good flavored. It is very disease resistant and bears reliably well north of the Twin Cities. It has only moderate vigor but bears well with medium size berries on small tight clusters.

TROLLHAUGEN (ES3-22-18) – Cross includes *V. labrusca* and *V. riparia* parentage. A blue seedless cultivar with small to medium sized berries in small tight clusters. It is very early to ripen typically 3-4 weeks before Concord. Cultivar has favorable table and dessert characteristics but fruit does not hang well nor does it store well. Only moderately cold hardy it will suffer injury during some winters.

FRENCH HYBRIDS

The French hybrids listed have been grown in Minnesota but have shown winter injury. They are not considered completely hardy for this area.

MARECHAL FOCH (Kuhlmann 188-2) – Cross includes *V. riparia, V. rupestris,* and *V. vinifera* parentage. Maréchal Foch is easily the hardiest of the French hybrids and often produces fruit in Minnesota even when left unburied. Formerly the most widely planted grape in Minnesota, locally grown Foch wines have won numerous awards over the years. However it is not reliable in Minnesota when left uncovered and has shown root injury in snowless conditions as well. This has led to its rapid decline in recent years. Moderately vigorous cultivar with small clusters and berries. Needs long cane pruning for sufficient yields. Good disease resistance. Partial secondary crop in event of spring freeze. Wine is reminiscent of Burgundy with some herbaceous characters if left on skins too long. Also, given minimal skin contact and cold fermented, Foch produces an excellent true rose. The grapes should not be allowed to hang on the vine after maturity or high pH levels will result in an unstable wine.

AMERICAN CULTIVARS

American cultivars that are grown in Minnesota are growing under different conditions than in eastern North America. Since the mean temperature in January is 10 to 15 degrees colder in Minnesota, many of the grapes that can survive out east may not here. Conditions during the growing season are similar however American grapes grown in the Midwest may have higher acid and less brix.

CONCORD – Cross includes *V. labrusca, with some V. vinifera.* The standard American blue grape, with typical strong *labrusca* flavor leading to high quality juice and jelly. Wine from Concord is often harsh and requires sweetening to be palatable. Because of its very late ripening and marginal hardiness below -20° F, Concord is not recommended except for extreme southern Minnesota.

Cold hardy American cultivars with *V. riparia* parentage that exhibit *V. labrusca* characteristics have been listed in the Northern hybrid group include: **Beta, Bluebell, Brianna, Edelweiss, Kay Gray, King of the North, Louise Swenson, Swenson White, Suelter and Valiant.**

VINIFERA CULTIVARS

Note that *V. vinifera* cultivars, such as Cabernet Sauvignon, Chardonnay, Pinot Noir and others, have been planted in Minnesota and have experienced complete loss of the vine in severe winters, even though the vines have been buried. Much of the *vinifera* in New York State was lost in 2003 due to a sudden change in December temperatures from 60 degrees to below freezing in a matter of days. The vines had not hardened off properly. *Vinifera* cultivars are not proven in Minnesota and should be considered a risk.

SEVERNYI – An interesting *V. vinifera* x *V. amurensis* hybrid from Russia. The name means "northern" and in initial tests in the Twin Cities, the vine appears to be both hardy and very early ripening. However, it seems to initiate bud break very early and thus appears susceptible to spring frost damage. Wine from Severnyi is a deep red and its flavor is quite interesting and complex. On the negative side, high acid levels make malolactic fermentation essential and the vine is extremely susceptible to powdery mildew. Flowers are pistillate, so it requires cross-pollination. In addition, it is believed to be susceptible to root injury from phylloxera and is thought to need to be planted on a resistant rootstock be reliable. Not widely available.

ADDITIONAL INFORMATION:

Additional information of grape cultivars is available on the ISU Viticulture Home Page in the publication titled **A Review of Cold Climate Grape Cultivars** (http://viticulture.hort.iastate.edu/cultivars/cultivars.html) written by Lisa Smiley in fulfillment of Masters of Agriculture degree. The review was published in 2008 and contains information on 73 cold climate cultivars.

Nurseries that propagate and sell grape cultivars adapted to cold climates are listed in the Resources section of this publication under **Sources of Grapevines.**

Table 21. Characteristics of cold hardy grape cultivars.

Cultivar	Color	Use	Bud Hardiness	Vigor	Growth habit	Harvest season		Cluster wt *in* lb	Market-ability	Comments
						From Lit.	*in* MN			
Aromella	W	W	H	V	SP	M	M/L-Sep	.27 (.17)	3	Extremely prone to 2,4-D and dicamba. Berries prone to shelling when mature.
Beta	B	J	VH	V	P	M	M-Sep	Sm	1	Produces small, acidic berries.
Bluebell	B	T,J,W	VH	V	P	EM	M-Sep	Med	1	High quality *labrusca*-type. Better table quality than Concord, but lighter juice color.
Brianna	W	W,T	EH	V	P	E	L-Aug	.24	4	Breaks bud early mid-season. Harvest before 18 Brix. Does not do well on high pH soils.
Concord	B	J,T,W	H	VV	P	LM	E-Oct	.30	2	Wines have characteristic *labrusca* flavor.
Edelweiss	W	T,J,W	H	VV	P	E	L-Aug	.32	3	Breaks bud very early. Harvest before 17 Brix. Does not do well on high pH soils.
Esprit	W	W	H	V	SP	M	L-Sep	.52	3	Breaks bud mid-season. Easy to shoot position. Wines tend to be mild & fruity.
Frontenac	B	W	EH	V	SU	LM	L-Sep	.34 (.23)	4	Breaks bud early mid-season. Can be very productive. Excellent fruit quality, but high acidity is common.
Frontenac gris	Cu	W	VH	V	SU	LM	L-Sep	.31 (.20)	4	Produces a clean, crisp white or salmon-tinged white wine w/ apricot or peach flavor.
Geneva Red	B	W	H	VV	SP	M	L-Sep	.31 (20)	3	Breaks bed very early. Vines are moderately productive on secondary buds.
Kay Gray	W	T,W	VH	VV	P	E	L-Aug	.21	3	Breaks bud very early. Fruit is relatively low in acids, wines rated good to very good.
King of the North	B	J,T,W	EH	VV	P	M	L-Sep	.25	1	Juice is aromatic with fruity *labrusca* character, acidity is high. Better suited for juice or jelly.
La Crescent	W	W	VH	V	P	EM	M-Sep	.32 (.23)	5	Breaks bud very early. Young shoots are prone to wind breakage. Berry set can be an issue. Prone to shelling.
La Crosse	W	W	H	VV	SU	EM	M-Sep	.25	2	Breaks bud early mid-season. Requires basal shoot and lateral shoot thinning. Clusters are tight; berries are thin-skinned & subject to leaking.
Louise Swenson	W	T,W	VH	MV	SP	EM	M-Sep	.25	2	Exhibits very good disease resistance. Fruit are low in sugar; produces an aromatic wine, but lacks body.
Leon Millot	B	W	H	VV	P	E	E-Sep	.17	3	Productive on secondary buds. Juice relatively low in acids, can be made into a variety wines.
Maréchal Foch	B	W	H	MV	SP	E	E-Sep	.20 (.16)	4	Breaks bud very early. Fruit relatively low in acids; can be made into a variety of wines.
Marquette	B	W	VH	V-VV	SP	EM	M-Sep	.25 (.15)	5	Breaks bud very early. Moderately productive on secondary buds. IA studies suggest it is less vigorous on high pH soils.
Mars	R	T	H	VV	P	E	E-Sep	(.35)	3	Can be harvested over an extended period. Produces well on secondary buds.
Petit Ami	W	W	H	MV	P	EM	M-Sep	.35 (.23)	3	Can produce up to 4 clusters per shoot. Fruit thinning is necessary. Shoots are slow to lignify.
Petite Pearl	B	W	EH	MV	P	LM	L-Sep	.20	4	New cultivar. Produces very dark wines with not herbaceous characters.
Prairie Star	W	W	VH	V	SU	EM	M-Sep	.37 (.22)	3	Young shoots are prone to wind breakage. Fruit set is an issue when it rains during bloom.
Sabrevois	B	W	H	VV	SU	EM	E-Sep	.22	2	Can be made into a high acid, medium bodied complex wine with good tannins when harvested early. Better suited for cooler climates.
St. Croix	B	W	VH	VV	SP	EM	E-Sep	.22	4	Breaks bud mid-season. Requires basal shoot and lateral shoot thinning. Berry set can be light. Berries are thin-skinned and prone to leaking.
St. Pepin	W	W,T,J	H	V	SP	EM	M-Sep	.30	4	Produces a very fruity wine with a slight *labrusca* flavor. Requires cross pollination. Low fruit set can be an issue.
Somerset Seedless	R	T	H	MV	P	E	L-Aug	.33	2	Berries are small, very sweet and flavorful.
Swenson Red	R	T,W	H	V	P	M	M-Sep	Med	1	Berries are large, have a meaty texture and adherent skin characteristic of *vinifera* type table grapes.
Swenson White	W	T,W	VH	V	SP	M	M-Sep	.37	2	Breaks bud mid-season. Produces a high quality wine with a pronounced floral aroma.
Trollhaugen	B	T,W	H	V	P	E	E-Sep	Sm	1	Produces sweet berries with a mild "Concord" flavor.
Valiant	B	T,J	EH	V	P	E	L-Aug	.20	2	An improvement over Beta. Not suited for wine.

Codes

Color: B = blue/black; W = white; R = red; Cu = copper.
Use: W = wine; J = juice & jelly; T = fresh table
Hardiness rating: H= hardy (-15 to -25 F); VH = very hardy (-20 to -30 F); EH = extremely hardy (-25 to -35 F).
Vigor: MV = moderately vigorous; V = vigorous; VV = very vigorous.

Harvest season: E = early; M = mid; L = late.
Growth habit: P = procumbent; SP = semi-procumbent; SU = semi-upright; U = upright.
Avg. cluster wt: (*in* ISU trials)
Marketability: (Scale 1 to 5) 1 = low; 5= very high.

Table 22. Relative disease susceptibility and chemical sensitivity of cold hardy grape cultivars.

Cultivar	Disease Susceptibility*							Chemical Sensitivity*			
	Black rot	Downy mildew	Powdery mildew	Botrytis	Phomopsis	Crown gall	Anthracnose	Sulfur	Copper	2,4-D	dicamba
Aromella	1	1	1	1	2	?	1	?	?	3	3
Beta	1	1	1	1	?	?	?	?	?	?	?
Bluebell	1	1	1	1	?	?	?	?	?	?	?
Brianna	2	1	1	1	?	?	?	2	1	2	2
Concord	3	1	2	1	3	1	1	Y	1	3	2
Edelweiss	?	1	2	2	?	1	2	N	N	2	2
Esprit	?	2	3	2	?	?	?	?	?	2	3
Frontenac	3	1	2	2	1	?	2	1	1	1	3
Frontenac gris	2	1	2	2	1	?	2	1	1	1	2
Geneva Red	1	2	2	2	1	1	1	N	?	1	3
Kay Gray	1	1	1	1	?	1	?	?	?	?	?
King of the North	1	3	1	?	3	?	1	?	?	?	?
La Crescent	2	3	2	1	3	1	2	1	1	1	3
La Crosse	2	3	2	1	3	1	2	N	N	1	3
Louise Swenson	1	1	2	1	?	?	2	?	?	?	?
Leon Millot	1	2	3	1	1	2	1	Y	1	2	3
Maréchal Foch	2	1	2	1	1	2	2	Y	1	3	3
Marquette	3	1	1	3	?	1	2	1	1	1	3
Mars	1	1	1	1	1	1	1	N	N	2	2
Petit Ami	2	?	?	?	?	?	1	?	?	?	?
Petite Pearl	?	?	?	?	?	?	?	?	?	?	?
Prairie Star	2	1	1	1	?	?	2	?	?	1	2
Sabrevois	1	1	1	1	?	?	?	?	?	?	?
St. Croix	?	2	2	2	3	?	1	1	1	1	2
St. Pepin	1	1	3	2	?	?	1	?	?	?	?
Somerset Seedless	1	2	1	?	?	?	?	?	?	?	?
Swenson Red	1	3	2	2	?	?	?	?	?	?	?
Swenson White	1	2	2	2	?	?	2	?	?	3	3
Trollhaugen	1	1	?	?	?	?	?	?	?	?	?
Valiant	1	3	1	2	?	?	?	1	1	?	?

* Key to rating: 1 = slightly susceptible or sensitive; 2 = moderately susceptible or sensitive; 3 = highly susceptible or sensitive; N = not sensitive; Y = Sensitive; ?= relative susceptibility or sensitivity not established.

[z] Adapted from: Bordelon, B., et al. (*annual publ.)*; Domoto, P., 2007; and McManus, P. et al., 2015

Vineyard Best Management Practices – Cultivar Selection

Rate the factors considered in selecting cultivars:

Management Area: **Cultivar characteristics**	**Best Practices**	**Minor Adjustments Needed**	**Concern Exists: Examine Practice**	**Needs Improvements: Prioritize Changes Here**
Cold hardiness and zone hardiness for average minimum winter temperatures.	Cultivar exhibits sufficient cold hardiness to perform well in your climatic zone.		Cultivar's cold hardiness is marginally suited for your climatic zone	Cultivar's cold hardiness is not suited for your climatic zone
Length of the growing season (LGS) (frost-free days)	LGS is long enough to properly mature the cultivar.	LGS is marginally long enough to mature the cultivar. Topography is suitable for extending the season.	LGS is marginally long enough to mature the cultivar. Topography is marginal for extending the season.	LGS is not long enough to mature the cultivar.
Growing Degree Days (GDD)	GDD is great enough to properly mature the cultivar.	GDD is marginally great enough to properly mature the cultivar. Topography is suitable for improving GDD.	GDD is marginally great enough to properly mature the cultivar. Topography is marginal for improving GDD.	GDD is not great enough to mature the cultivar.
Topography and the frequency of spring frosts	Earliest blooming cultivars to be grown on sites least prone to spring frosts.		Sequence of bloom was not considered in laying out the vineyard.	
Marketability	Cultivar ranks very high for demand and prices received.	Cultivar ranks high for demand and prices received.	Cultivar ranks moderately high for demand and prices received.	Cultivar ranks low for demand and prices received.
Productivity	Cultivar is productive without any issues that may limit production.	Cultivar is productive with some issues that may limit production.	Cultivar is moderately productive with some issues that may limit production.	Cultivar is moderately productive with several issues that may limit production.
Disease susceptibility	Cultivar exhibits good resistance to most diseases.	Cultivar exhibits moderate resistance to most diseases.	Cultivar exhibits moderate susceptibility to some diseases.	Cultivar exhibits susceptibility to several diseases.
Sensitivity to sulfur or copper fungicides	Cultivar exhibits good tolerance to sulfur or copper sprays	Cultivar exhibits slight sensitivity to sulfur or copper sprays	Cultivar exhibits moderate sensitivity to sulfur or copper sprays	Cultivar exhibits sensitivity to sulfur or copper sprays
Sensitivity to 2,4-D or dicamba herbicide drift	Cultivar exhibits good tolerance both 2,4-D and dicamba drift.	Cultivar exhibits moderate sensitivity to either 2,4-D or dicamba drift	Cultivar exhibits sensitivity to either 2,4-D or dicamba drift	Cultivar exhibits sensitivity to both 2,4-D and dicamba drift.