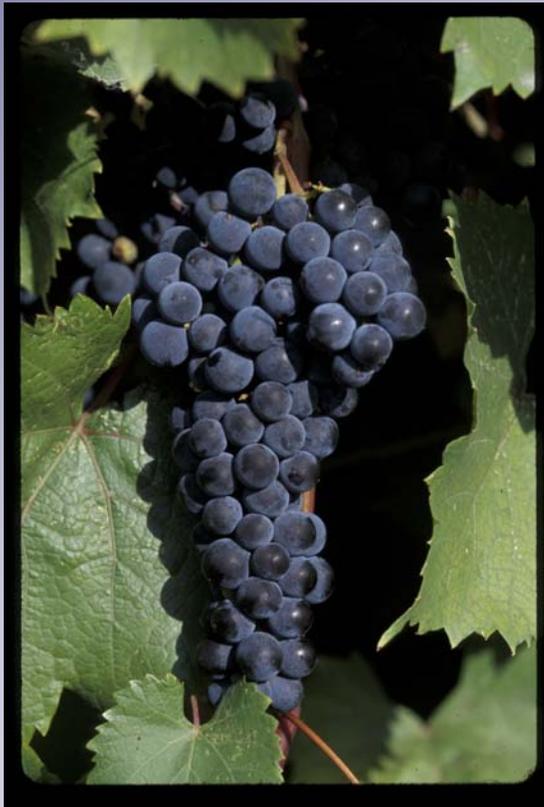


Cold Climate Viticulture in Vermont



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<http://pss.uvm.edu/grape/>

-Cultivar Selection- Factors to Consider



- ⌘ Vine Hardiness
- ⌘ Fruit Characteristics
- ⌘ Season of Ripening (early, mid, late)
- ⌘ Disease and Insect Resistance
- ⌘ Vine Characteristics

A Key Factor in Cultivar Selection in Vermont....



⌘ Vine Hardiness

⌘ Fruit Characteristics

⌘ Season of Ripening (early, mid, late)

⌘ Disease and Insect Resistance

⌘ Vine Characteristics

Hardiness Ranges



⌘ "tender"	0°F to -10°F
⌘ "slightly hardy"	-5°F to -15°F
⌘ "moderately hardy"	-10°F to -20°F
⌘ "hardy"	-15°F to -25°F
⌘ "very hardy"	-25°F to -35°F

Vitis vinifera



⌘ Most tender

⌘ Fruit buds injured at -10 F

⌘ Vines are often killed at -15 F or lower.

French-American Hybrids **have been Rated as:**



⌘ “Moderately Hardy”

⌘ “Hardy”

⌘ “Very Hardy” (a few)

Table 3. French-American Hybrid Cultivars for the Midwest.

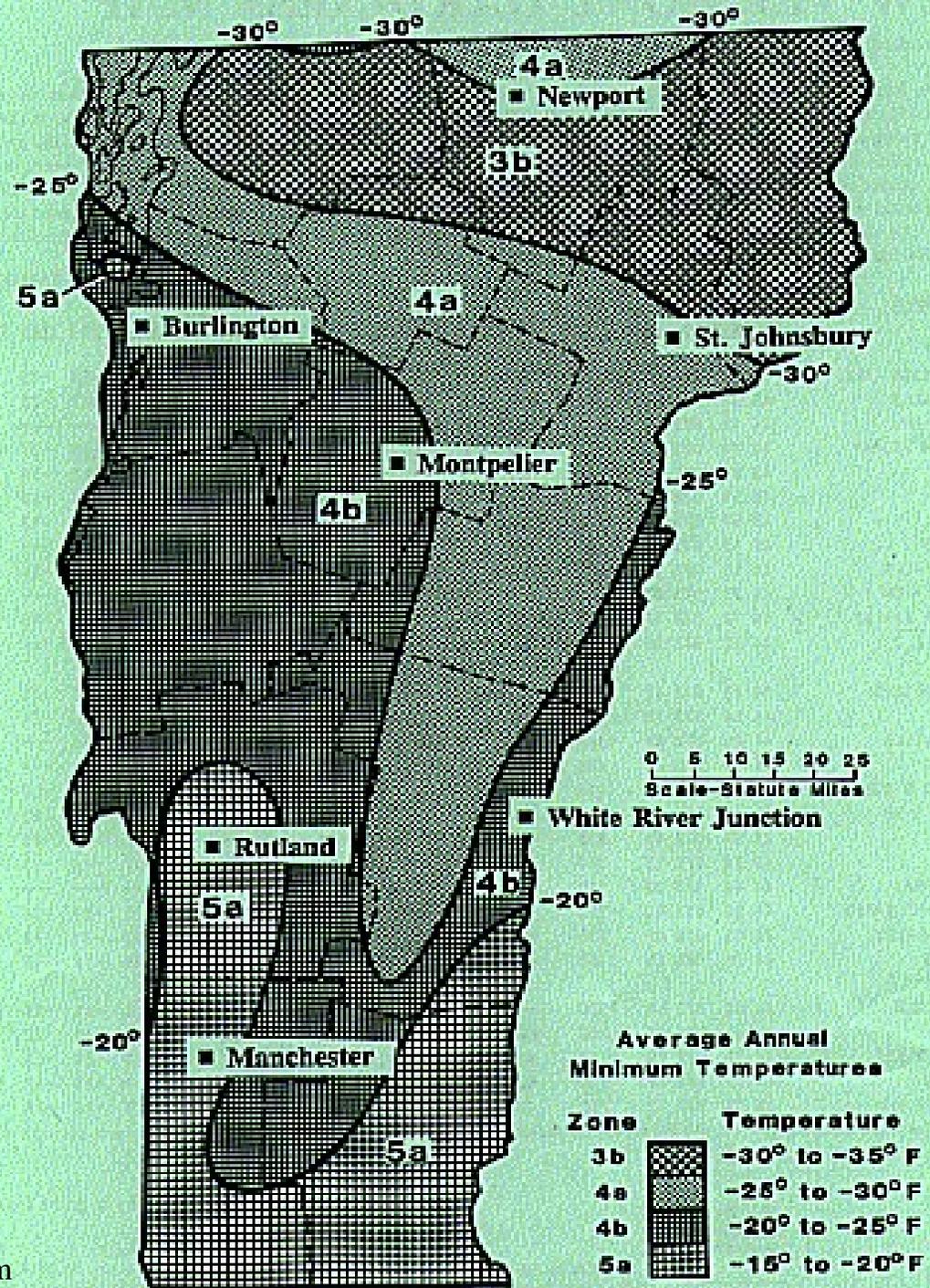
Cultivar	Color	Average Cluster Wt. (lbs)	Winter Hardiness	Days from Bloom to Harvest**	Ripening Date	Remarks
Cayuga White	White	0.33	Moderately Hardy	100	Midseason	Fully ripened produces labrusca character; susceptible to anthracnose.
Chambourcin	Blue	0.42	Moderately Hardy	115	Late	Moderate vigor; large clusters; needs thinning; high-quality wine.
Chancellor	Blue	0.25	Hardy	100	Early Midseason	Thinning necessary; good vigor; fruit susceptible to downy mildew; susceptible to crown gall in low wet sites.
Chardonel	White	0.36	Moderately Hardy	110	Late Midseason	Requires no thinning; loose clusters; less susceptible to bunch rot than Seyval; more cold hardy than Chardonnay but less than Seyval.
DeChaunac	Blue	0.24	Hardy	105	Midseason	Moderate red wine quality, good vigor and productivity, requires thinning.
Leon Millot	Blue	0.18	Very Hardy	85	Early	Small, loose clusters; small berries; bird predation a problem.
Marechal Foch	Blue	0.20	Very Hardy	90	Early	Small, tight clusters; low vigor; bird predation a problem.
Seyval Blanc	White	0.43	Hardy	100	Early Midseason	Moderate vigor; requires thinning; clusters susceptible to bunch rot.
Traminette	White	0.24	Moderately Hardy	110	Late Midseason	Vigorous; hardier than Gewurztraminer but similar wine.
Vidal blanc	White	0.34	Moderately Hardy	110	Late Midseason	Good vigor; late budbreak; requires thinning; loose clusters; adaptable to many wine styles, including ice wine; best if grafted for virus protection.
Vignoles	White	0.17	Hardy	105	Midseason	Small tight clusters; moderate yields and vigor; very susceptible to bunch rot; high-quality wine.

* Winter hardiness rating: tender, 0°F to -10°F; lightly hardy, -5°F to -15°F; moderately hardy, -10°F to -20°F; hardy, -15°F to -25°F; and very hardy, -20°F to -35°F.

** Bloom occurs four to six weeks after bud break.

Vermont Hardiness Zones

PLANT HARDINESS ZONES IN VERMONT



Source: Perry, L. New Vermont Hardiness Map.
<http://www.uvm.edu/~uvmext/publications/oh/oh53.htm>

***Why is there a developing
winegrape industry in Vermont
now?***

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winegrape industry in Vermont
now?***

Global Warming ?

***Why is there a developing
winegrape industry in Vermont
now?***

~~***Global Warming ?***~~

***Because of availability of cold-hardy
winegrape cultivars such as ...***

“New” Cold-Hardy Wine Grape Cultivars



St. Croix



Frontenac

La Crescent

Elmer Swenson ← + → Univ. of Minnesota

Partial List of Grape Cultivars



⌘ **Frontenac**

⌘ **Frontenac Gris**

⌘ **LaCrescent**

⌘ **Louise Swenson**

⌘ **MN 1211 (Marquette)**

⌘ **Prairie Star**

⌘ **St. Croix**

⌘ **St. Pepin**

⌘ **Swenson White**

⌘ **LaCrosse**

⌘ **Sabrevois**

The following Cultivar Information comes from Minnesota sources such as:

• **University of Minnesota** - Commercial Fruit Production in Minnesota - Grapes:

<http://fruit.coafes.umn.edu/grape/index.htm>

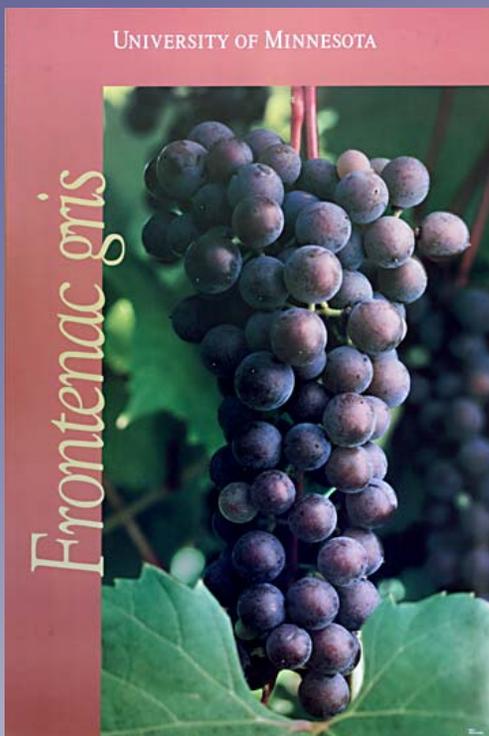
• **Minnesota Grape Growers Association** -

Varieties: <http://www.mngrapes.org/varieties.html>



Frontenac

- ⌘ Origin: MN 89 x Landot 4511; U of M, 1996.
Uses: Red wine.
- ⌘ More vines of Frontenac are growing in MN than of any other variety, due to overall viticultural performance and excellent wine quality.
- ⌘ Very cold-hardy vine and has borne a full crop after temperatures as low as -30° F.
- ⌘ The small black berries are produced on medium to large clusters that are usually slightly loose.
- ⌘ Consistently heavy producer; may require cluster thinning.
- ⌘ Ripens in late midseason.
- ⌘ Wine typically has a pleasant cherry aroma with berry and plum evident in many cases



⌘ White wine. Found growing at the University of Minnesota as a sport of Frontenac.

⌘ Culturally, it is identical to Frontenac, having high vigor and yields.

⌘ Hardy to at least -38 F.

⌘ Small grey berries are born on medium sized, loose clusters.

⌘ Suitable for high quality table and dessert wines, possibly ice wine as well.

⌘ Ripens mid-season with aromas that include peach, apricot, citrus, and pineapple.

⌘ Labrusca and herbaceous aromas have not been detected.



Frontenac & Frontenac Gris



- ⌘ White wine grape variety - makes a Germanic character wine reminiscent of Vignoles or Riesling
- ⌘ Origin: St. Pepin x ES 6-8-25; U of M, 2002
- ⌘ Very winter hardy with trunks surviving temp. as low as -36 F
- ⌘ Mid-season variety with an average harvest date of Sept. 26 in Minnesota (approx. 45-degree latitude)
- ⌘ Yields and vigor are moderate
- ⌘ Small to medium amber berries on medium clusters that are slightly loose to loose
- ⌘ Wine quality is high when finished in a semi-sweet style, and aromas include apricot, citrus, and pineapple with no herbaceous or labrusca aromas.

La Crescent



St. Croix

- ⌘ Origin: Elmer Swenson, 1983.
- ⌘ Red wine
- ⌘ Hardy to -32 F or better
- ⌘ Many award winning wines have been made from St. Croix [it's relatively easy to make good quality wine from this grape]
- ⌘ Vinifera-like, with good fruit and low tannin
- ⌘ Ripens mid season

Latest Named MN Winegrape Cultivar



**Marquette
MN1211**

- ⌘ Origin: MN 1094 and the French Hybrid cultivar Ravat 262
- ⌘ Withstands temperatures as low as -36° F without serious injury.
- ⌘ Open and orderly growth habit
- ⌘ Ripens mid-season, a few days before the standard cultivar Frontenac.
- ⌘ Wines have been excellent, exceeding nearly all non-*V. vinifera* varieties in quality ratings. Tasters have noted an attractive deep red color, desirable aromas of cherry, black pepper, spice, and berry, and substantial tannin structure rarely found in hybrid wines.

The passing of an influential person...

ELMER SWENSON
1913 - 2004



Source: <http://www.littlefatwino.com/swensonmemorial.html>

University of Minnesota Breeding Program



UNIVERSITY OF MINNESOTA

Grape Breeding and Enology Projects

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Mission Overview



Minnesota, due to the extreme severity of its winters, lies well outside the traditional grape growing regions of the United States. European varieties (*Vitis vinifera*) and some hybrids must be buried to prevent cold injury (left). The development of a successful Minnesota wine industry hinges on several factors, ranging from new grape cultivars to more efficient communication of technological advances. The work of the grape-breeding program at the University of Minnesota's Horticultural Research Center addresses the most pressing need; that of appropriate wine grape cultivars. Working in cooperation with the breeding program, the enology project will fill the remaining needs for extensive knowledge of the properties and processing of available grape cultivars, and for a regional source of technical and analytical support.



On-Line Resources - Cultivars

- ⌘ **University of Minnesota** - Commercial Fruit Production in Minnesota - Grapes:
<http://fruit.coafes.umn.edu/grape/index.htm>
- ⌘ **Minnesota Grape Growers Association** - Varieties:
<http://www.mngrapes.org/varieties.html>
- ⌘ **Cornell University** - The Less Risky Varieties, Old and New:
<http://www.nysaes.cornell.edu/hort/faculty/reisch/winehandout.html>

The Less Risky Varieties, Old and New

Bruce I. Reisch and Steve Luce

NYS Agricultural Experiment Station, Cornell University

Geneva, New York

Presentation to the Finger Lakes Grape Growers' Convention, March 4, 2005

	<u>Red Wine Grapes</u>	<u>White Wine Grapes</u>
<i>Most Hardy:</i>	Frontenac GR 7 Maréchal Foch St. Croix	La Crescent Ravat 34 NY76.0844.24 Vignoles <?>
<i>Intermediate Hardiness:</i>	NY70.0809.10	Traminette NY62.0122.01
<i>Less Hardy Hybrids:</i>	Chambourcin Chelois NY73.0136.17	Cayuga White Vidal blanc
<i>Least Hardy:</i>	(vinifera)	(vinifera)

Vermont Vineyards



Partial List of Winegrape Cultivars Planted in Vermont

- ⌘ Arctic Riesling
- ⌘ Baco Noir
- ⌘ Bianca
- ⌘ Cayuga White
- ⌘ Frontenac
- ⌘ Frontenac Gris
- ⌘ LaCrescent
- ⌘ LaCrosse
- ⌘ Leon Millot
- ⌘ Louise Swenson
- ⌘ Marechal Foch
- ⌘ Marquette
- ⌘ Prairie Star
- ⌘ Riesling
- ⌘ Sabrevois
- ⌘ Seyval
- ⌘ St. Croix
- ⌘ St. Pepin
- ⌘ Swenson Red
- ⌘ Swenson White
- ⌘ Traminette
- ⌘ Vidal blanc
- ⌘ Vignoles
- ⌘ Zweigelt

Vermont – SARE Partnership Grant

Evaluate Horticultural Performance of Selected Grape Cultivars under Vermont Conditions



Cultivar Selection



⌘ Vine Hardiness

⌘ Fruit Characteristics

⌘ Season of Ripening (early, mid, late)

⌘ **Disease and Insect Resistance**

⌘ Vine Characteristics

Major Grape Diseases



⌘ Powdery Mildew

⌘ Downy Mildew

⌘ Black Rot

⌘ Botrytis bunch rot and blight

⌘ Crown Gall

⌘ Angular Leaf Scorch

⌘ Phomopsis cane and leaf spot

Diseases Observed in Vermont



Disease Resistance in MN

- ⌘ **Frontenac** -- “very disease-resistant, with good resistance to powdery mildew and near-immunity to downy”
- ⌘ **Frontenac Gris** – “Good, with moderate susceptibility to powdery mildew and black rot, and very low susceptibility to downy mildew”
- ⌘ **La Crescent** -- “ low susceptibility to powdery mildew and black rot, moderate susceptibility to downy mildew (on the leaves)”
- ⌘ **St. Croix** – “Susceptible to downy mildew, but resists powdery mildew and black rot”
- ⌘ **Marquette** – “Resistance to downy mildew, powdery mildew and black rot has been excellent and the vine requires only a minimal spray program”

Disease Resistance in Vermont 2004: Non-Sprayed

	Powdery mildew		Downy mildew		Black rot		% Total Cluster Area infected**
Cultivar	% Incidence Leaves		% Incidence Leaves		% Incidence leaves		
Frontenac	66 b		2 c		23 a		19 c
Leon Millot	79 b		99 a		8 a		56 b
Riesling	100 a		70 b		7 a		92 a
St. Croix...	27 c		0 c		23 a		25 c

Disease Resistance in Vermont

2005: Non-Sprayed

	Powdery mildew		Downy mildew		Black rot		% Total Cluster Area infected**
Cultivar	% Incidence Leaves		% Incidence Leaves		% Incidence Leaves		
Frontenac	0		8		69		44
Leon Millot...	48		95		2		57
Riesling	--		--		--		--
St. Croix..	0		0		60		32

Grape Insect Pests

⌘ Grape Berry Moth



⌘ Grape Leafhopper



⌘ Grape Phylloxera
(leaf form)



University of Vermont - Cold Climate Grape Production Website

<http://pss.uvm.edu/grape/>

Cold Climate Grape Production, University of Vermont Extension - Netscape

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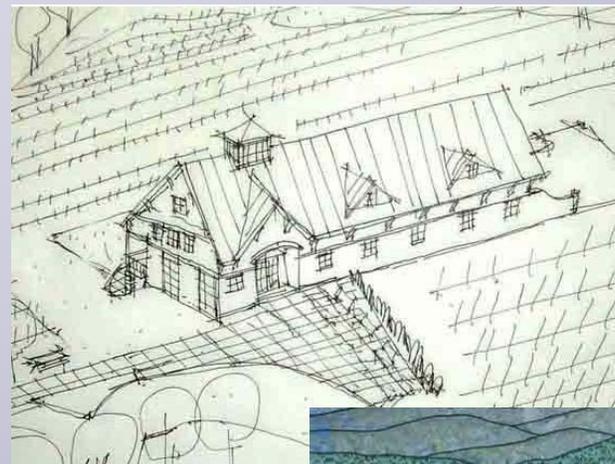
[Funding](#)

[Home Page](#)

What's New...

- ◆ [Grape Vine Phenology associated with Growing Degree Days for Vermont sites](#)
- ◆ [Weekly Growing Degree Day Accumulation for selected Vermont sites](#)
- ◆ [IPM Primer](#) - basic introduction to concepts, strategies, and components of an IPM program
- ◆ [Cold Climate Grape IPM News](#) - link to issues
- ◆ ["Vinewatch"](#) - recent observations in Vermont vineyards

Some Vermont Vineyards...



Vermont Collaborators



⌘ Champlain Valley Vineyard

⌘ Lincoln Peak Vineyard and Nursery

⌘ Shelburne Vineyard

⌘ Snow Farm Vineyard

Acknowledgements



EPA Pesticide Environmental
Stewardship Grant

Thank You !!

