

Grape Cultivars for the Upper Midwest

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Grape Cultivar Types

American- selections from wild species found in North America (*labrusca*, *aestivalis*) and results of breeding

Ex. Concord, Catawba, Niagara, Delaware, Cynthiana/Norton

French-American Hybrids- Hybrids between *V. vinifera* and various North American species

Ex. Seyval, Vidal, Vignoles, Chambourcin, Foch, etc.

European- *Vitis vinifera* Ex. Chardonnay, Cabernet Sauvignon, Riesling, etc.

History of French Hybrid Development

Introduction of Phylloxera and Downy Mildew fungus into Europe in the mid 1800's

Use of American species to develop 'Direct Producers'

Hybridization to incorporate phylloxera and disease resistance with fruit quality from vinifera

Use of American species to develop rootstocks

**Resistant to phylloxera, high lime soils, nematodes, drought.
Compatibility in grafting, rootability, etc.**

History of French Hybrids in America

Phillip Wagner introduced several French hybrids to US after WWII

Adaptation to the climate and soils of the Eastern US was excellent due to the wild species parentage

Wine quality was superior to common labrusca types

US Breeding Programs

Major objectives: Cold hardiness, Disease resistance, Fruit/wine quality

New York State Ag Expt. Sta. - Geneva

Bruce Reisch (John Einset)

University of Minnesota

Peter Hemstad and Jim Luby

Elmer Swenson (Osceola, Wisconsin)

University of Arkansas

Jim Moore, John Clark and Justin Morris

Considerations for Cultivar Selection

ADAPTATION-

- Winter hardiness
- Date of budbreak, ripening, etc.
- Ease and consistency of production-
 - Productivity and vigor- cluster thinning? shoot thinning? crop on secondary buds?
 - Growth habit- upright, trailing, shoot positioning?
 - Disease Resistance- number and timing of sprays

MARKETABILITY-

Supply / Demand / Price / Marketing options

Fruit Quality / Wine Quality

Matching Cultivars to Sites

- **Cold hardiness**
match to expected winter minimum temp
- **Date of maturity**
match to length of growing season
- **Date of budbreak**
match to spring frost probability
- **Disease resistance**
match to climate of site, endemic diseases
- **Soil adaptation (ownrooted or grafted)**
match to soils
- etc. etc. etc.

USDA Plant Hardiness Zone Map

Zone 4

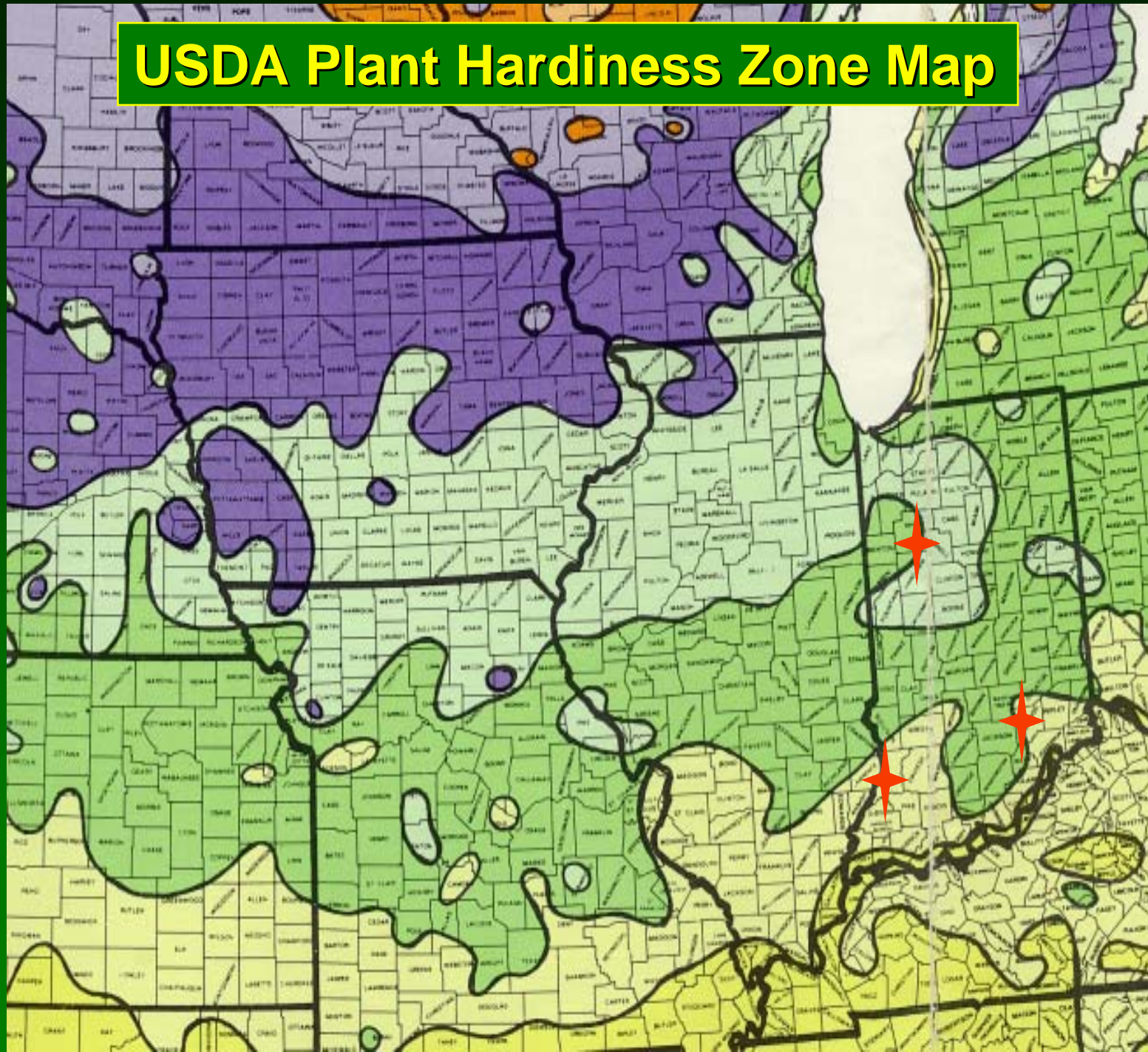
-20 to -30 °F

Zone 5

-10 to -20 °F

Zone 6

0 to -10 °F



Minimum Winter Temperature

Cold injury

Loss of crop due to bud damage

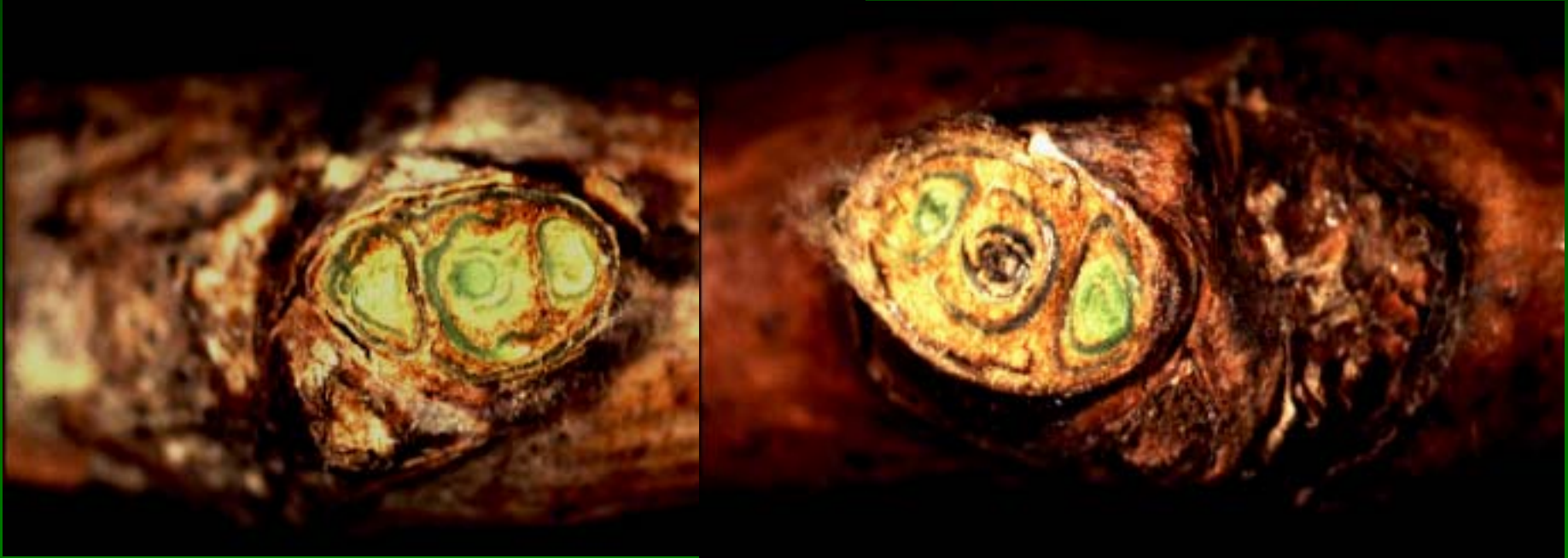
Damage to canes, trunks = crown gall

Death of vines

Cultivars differ in cold hardiness

Match cultivar (hardiness) to site

Cold Damage to Buds



Live compound bud

Dead primary bud

Cold Damage to Buds



Cold Damage to Trunks

Crown Gall and Aerial Rooting



Acceptability of Sites for Grapes in the Midwest

- **Excellent** (Zone 6b or 7)
0 °F to -5 °F annual minimum
- **Good** (Zone 6a or 6b)
-5 °f to -10 °F annual minimum
- **Acceptable** (Zone 5b or 6a)
-10 °F to -15 °F annual minimum
- **Poor** (Zone 4b or 5a)
-15 °F to -20 °F annual minimum

Match Cultivar Hardiness to Site

- **Excellent sites (0 to -5)**
 - all commercial cultivars (including vinifera)
- **Good sites (-5 to -10)**
 - most commercial cultivars
- **Acceptable sites (-10 to -15)**
 - moderately hardy cultivars
- **Poor sites (-15 to -20)**
 - only hardy and very hardy cultivars

Relative Cold Hardiness of Grape Cultivars

Very Hardy: Swenson hybrids: LaCrosse, St. Croix, St. Pepin, Edelweiss, Frontenac, Foch, Leon Millot, Ventura

Hardy: DeChaunac, Chancellor, Vignoles, Cynthiana, Steuben, Concord, Catawba, Niagara, Delaware

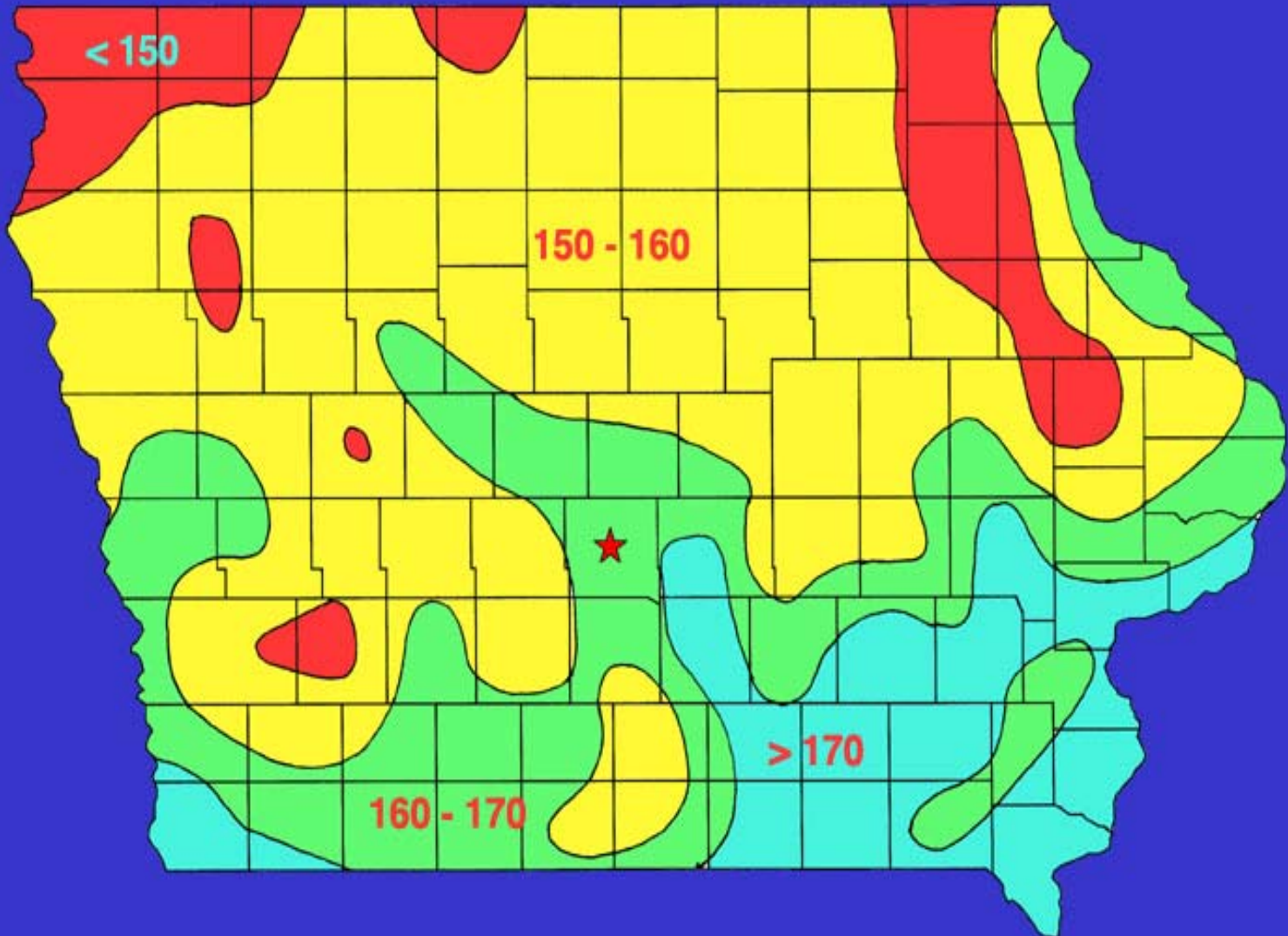
Moderately Hardy: Seyval, Traminette, Melody

Moderately Tender: Vidal, Chambourcin, Chardonel, Cayuga White

Tender: Cabernet franc, Riesling, Chardonnay, Cabernet Sauvignon

Very Tender: Merlot, Pinot noir, Gewurztraminer

Growing Season Length



Matching Cultivar to Growing Season Length

Short Season: <160 days

Early ripening French hybrids

(Foch, Leon Millot, Baco noir, St. Croix, St. Pepin, LaCrosse, Frontenac, etc.?)

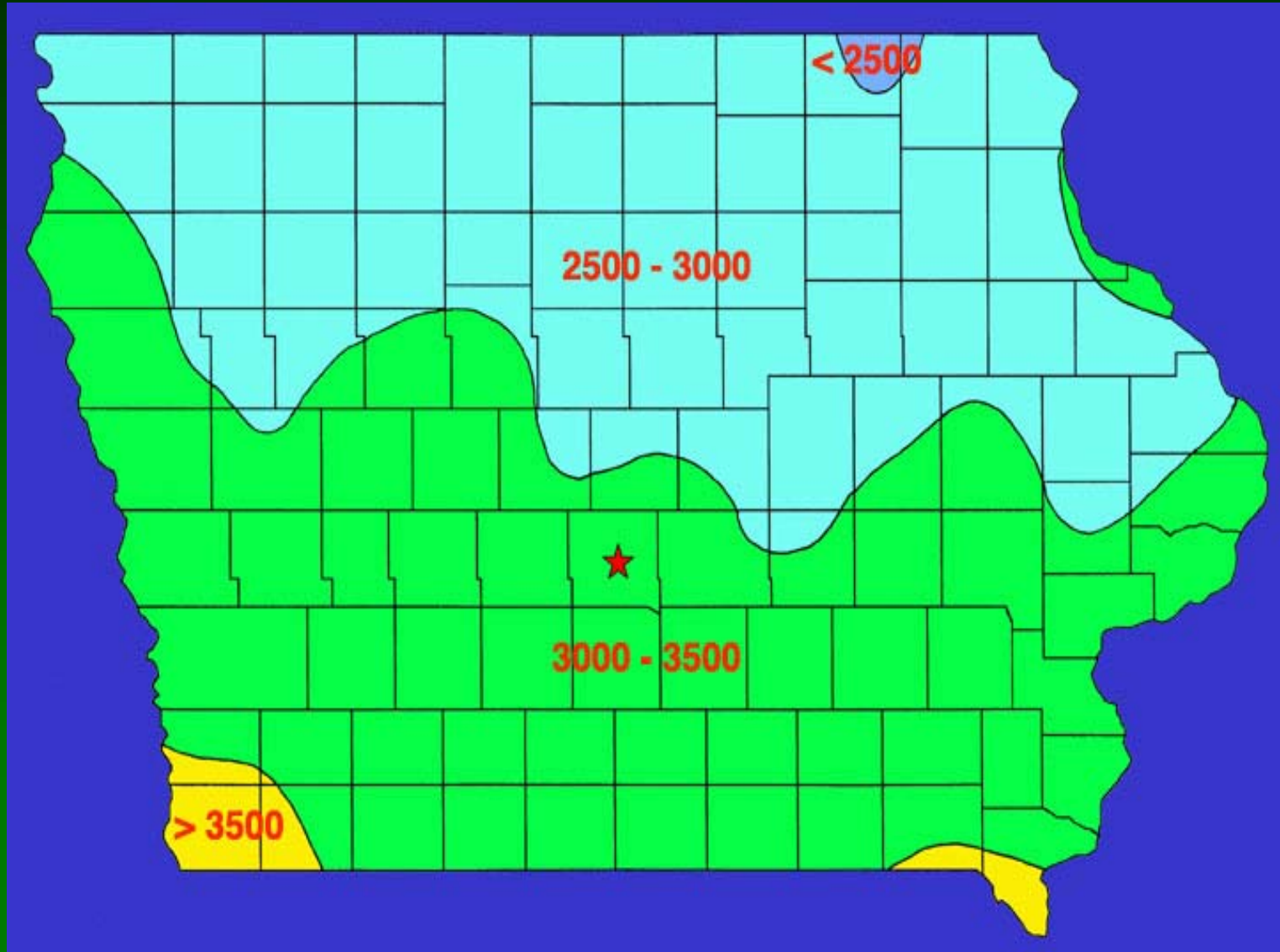
Moderate Season: 160-180 days

Most French hybrid and American, early vinifera

Long Season: 180+ days

French hybrid, American, and vinifera

Growing Degree Days



GDDs and Fruit Quality

- **Late ripening cultivars need 3000 or more GDDs to fully ripen**
- **Early ripening cultivars need 2500 or less GDDs to fully ripen**
- **However..... season length will be more limiting than GDDs for the upper Midwest**

Cultivar Market Potential

- **Vinifera - very high**
- **French-American Hybrids - high**
- **American - moderate to high**

Cultivar Profit Potential

- **French-American Hybrids - high**
- **American - moderate (large supply)**
- **Vinifera - low (inconsistent production)**

White Winegrapes for the Midwest

Top Three: Seyval, Vidal, Vignoles

**Chardonnay, Traminette, Cayuga White,
LaCrosse**

American types: Niagara, Catawba, Delaware

Vinifera: Riesling, Chardonnay, Pinot gris

Red Winegrapes for the Midwest

Top Three: Foch, Chancellor, Chambourcin

**Cynthiana/Norton, Baco noir, Leon Millot,
Frontenac**

American types: Steuben, Concord, Fredonia

**Vinifera: Cabernet franc, Cabernet Sauvignon,
Lemberger, Pinot noir**

White Wine Cultivars for the Upper Midwest

LaCrosse

Edelweiss

Esprit

St. Pepin

Ventura

Vignoles

Seyval

Melody

Traminette

Niagara

Delaware

LaCrosse

Released by Elmer Swenson in 1983

((Minn. 78 x S. 1000) x Seyval)

Characteristics

Very hardy

Mod-late budbreak

Mid-late season maturity

Productive (8-9 tons/acre)

Small tight clusters, fruit prone to sunburn

Susceptible to DM, BR

Very prone to leaf phylloxera

Tolerant of 2,4-D

Excellent wine with fruity character, slightly foxy if fully ripe

LaCrosse



Edelweiss

Released by Elmer Swenson

Characteristics

Very hardy

Early maturity

Large, loose clusters

Med to small berries, amber at maturity

Vigorous and highly productive

Susceptible to BR

Flavor similar to parent variety Ontario, labrusca

Esprit

Released by Elmer Swenson

Characteristics

Moderately hardy

Vigorous and productive

Large clusters of large berries

Susceptible to PM

Used fresh or for juice or labrusca type wine

St. Pepin

Released by Elmer Swenson

Sibling of LaCrosse

Characteristics

Hardy

Early ripening

Small clusters of medium berries

Female vine requires pollinizer

Very fruity wine

Ventura

Released by HRIO at Vineland, 1974

(Chelois x Elvira)

Characteristics

Very hardy

Mod-early budbreak and mod-late maturity

Small clusters - mod-high productivity (10 tons/acre)

Good growth habit - easy to manage

Mod susceptible to DM

Wine has pronounced labrusca aroma and flavor when fruit is fully ripe (Elvira replacement)

Vignoles

Ravat 51

Named by the Finger Lakes Wine Growers Association in 1970
(S. 6905 x Pinot de Corton)

Characteristics:

Moderately hardy

Late budbreak, early- mid season maturity*

Moderate to low productivity

Low vigor when young, high vigor when mature

Small clusters - does not need cluster thinning

Very susceptible to Bot, Phom- Fruit rots

Moderately susceptible to PM, DM, CG

Excellent wine quality

Seyval blanc

S.V. 5-276

Most popular white wine grape in Eastern US

Released 1921 Seyve-Villard

(S. 5656 x S. 4986 (Rayon d'or))

Characteristics:

Moderately hardy

Mid-early budbreak and maturity

Moderate to low vigor (rootstocks ?)

Medium-large clusters *Needs cluster thinning

Very susceptible to PM and Bot

Moderately susceptible to BR, DM, Phom, CG

Excellent wine quality, versatile

Melody

(NY 65.444.4)

Released in 1985 by New York Ag Expt Station
(Seyval x GW 5 = (Pinot blanc x Ontario))

Characteristics

Moderately hardy

Very late budbreak

Mid-late season maturity

Productive (6-8 tons/acre)

Moderately susceptible to DM

Wines fruity, floral

Traminette

(NY 65.533.13)

Released 1996 New York Ag Expt Station
(J.S. 23-416 x Gewurztraminer)

Characteristics:

Moderately hardy

Mid-season (1 week after Seyval)

Moderately productive (4-5 tons/acre)

Large, loose clusters - little bunch rot*

Moderately susceptible to DM

Spicy fruit character similar to Gewurztraminer

Niagara

Introduced 1882 by the Niagara Grape Co.

Concord x Cassady

Characteristics:

Moderately hardy (less than Concord)

Mid-early budbreak

Mid-early maturity

Mod-high vigor

Medium - large clusters , large berries

Moderately susceptible to BR, DM

Good labrusca type white wine and juice

Delaware

Popular cultivar 1850-on. Likely a hybrid between vinifera and native American species. Named for Delaware, OH where it was first popular. Considered one of the best grapes for table or wine use at the time.

Characteristics:

Moderately hardy

Mid-early budbreak

Mid-early maturity

Mod-high vigor

Small clusters

Moderately susceptible to DM

Very sensitive to 2,4-D

Red Wine Cultivars for the Upper Midwest

Marechal Foch (Kuhlmann 188.2)

Leon Millot (Kuhlmann 194.2)

Frontenac (MN-1047)

St. Croix

Cynthiana (aka Norton)

Chancellor (Seibel 7053)

Steuben

Concord

Fredonia

NY 70.809.10 (S.V. 18-307 x Steuben)

NY 73.136.17 ((NY 33277 x Chancellor) x Steuben)

Marechal Foch

Kuhlmann 188.2

Released ?

riparia-rupestris (101-14 Mgt) x Goldriesling = (Riesling x Courtiler musque) or Oberlin 595 x Pinot noir

Characteristics:

Hardy

Very early bud break and maturity, poor secondary crop

Productive (6-10 tons/acre)

Moderate vigor(rootstocks?)

Moderately susceptible to BR, PM

Slightly susceptible to DM, Bot, CG

Sensitive to 2,4-D

Excellent wine quality, versatile

Foch

M. Foch



Leon Millot

Kuhlmann 194.2

Released ? Sister seedling of Marechal Foch

**riparia-rupestris (101-14 Mgt) x Goldriesling = (Riesling x
Courtiler musque) or Oberlin 595 x Pinot noir**

Characteristics:

Hardy

Early bud break and maturity, poor secondary crop

Small clusters

Moderate vigor, more vigorous than Foch

Moderately susceptible to BR, PM

Slightly susceptible to DM

Less sensitive to 2,4-D than Foch

Good wine quality but not as popular as Foch

Frontenac (MN-1047)

**Released in 1995 by Univ. of Minnesota
(V. riparia #89 x Landot 4511)**

Characteristics:

Very hardy

Mod-late budbreak, mid-season ripening

Medium clusters - poor set?

Mod susceptible to PM

Good growth habit - easy to manage

**High acid, high sugar, fruity character (cherry,
plum, berry), good tannins**

St. Croix

E.S. 2-3-21

**Released by Elmer Swenson in 1981
(Minn 78 x S. 1000) x (Minn 78 x Seneca)**

Characteristics

Hardy

Very vigorous

Med to small clusters

Productive & precocious - may need thinning

Resistant to BR, Susceptible to DM

Neutral flavor

Cynthiana (Norton)

Wild selection of *V. aestivalis*

Characteristics

Hardy

Late budbreak and very late maturity

Small, very tight clusters - low productivity

Very disease resistant

Sensitive to 2,4-D

Wild growth habit - difficult to manage

High pH + high TA, Good tannins for full-bodied red

Chancellor

Seibel 7053

(S. 5163 x S. 800) Named by the Finger Lakes Wine Growers Assoc. in 1970

Characteristics:

Hardy

Early budbreak, but good crop on secondary buds

Early-mid season maturity

Very productive - may need extra crop control in early years to prevent vigor loss

Medium clusters - may need thinning

VERY susceptible to DM

Moderately susceptible to PM, Phom, CG

Slightly susceptible to BR, Bot

Steuben

**Released in 1946 by New York Ag Expt Station
(Wayne x Sheridan)**

Characteristics

Hardy

Mod-late budbreak, mod-late maturity

Large, compact clusters

Moderately resistant to diseases

**Spicy fruit makes good labrusca type wine (Rose') and is
acceptable for table use.**

Steuben



Concord

**Introduced 1854 by the E.W. Bull of Concord, Mass.
Widely grown in the Eastern US for juice and jelly
(Welch's)**

Characteristics:

Hardy

Early budbreak

Mid-season maturity

Mod-high vigor

Medium - large clusters , large berries

Moderately susceptible to BR, DM, PM

Very sensitive to 2,4-D

Fredonia

**Introduced 1927 by the New York Ag. Expt. Station.
Often used in sherry production. Not as strong
flavored as Concord**

Characteristics:

Hardy

Mid-early budbreak

Mid-early maturity

Mod-high vigor

Medium - large clusters , medium berries

Moderately susceptible to DM, Phomopsis

NY 70.809.10

Unreleased selection (S.V. 18-307 x Steuben)

Characteristics

Moderately hardy

Late budbreak, mod-late maturity

Large loose clusters, mod productive

Susceptible to DM

Makes light, fruity wine (Gamay type)

NY 73.136.17

Unreleased selection

((NY 33277 x Chancellor) x Steuben)

Characteristics

Moderately hardy

Mod-late budbreak, mod-late maturity

Large, loose clusters

Mod productive

Susceptible to BR

Good tannins for full-bodied red wine

Table Grapes for the Upper Midwest

Seedless

Reliance

Mars

Jupiter

Canadice

Seeded

Swenson Red

Steuben

Edelweiss

Reliance

Released 1982 Univ. of Arkansas

Characteristics

Hardy

Mod-late budbreak, moderate maturity

Large, loose clusters

Med to small berries, pink at maturity

Mod productive

Susceptible to BR, DM

Susceptible to fruit cracking if rain near harvest

**Excellent flavor, slip-skin, high sugar content,
small seed trace**

Mars

Released 1984 Univ. of Arkansas

Characteristics

Moderately hardy

Mod-early budbreak, moderate maturity

Medium sized tight clusters

Med to large berries, blue-red at maturity

Highly vigorous, productive, precocious

Resistant to most foliar diseases

Good flavor, slip-skin, small seed trace

Jupiter

Released 1998 Univ. of Arkansas

Characteristics

Moderately hardy

Mod-late budbreak, moderate maturity

Large, loose clusters

Large berries, red-blue at maturity

Highly productive

Susceptible to DM

Fruit cracking occasional problem

Excellent mild muscat flavor, adherent skin, firm texture

Canadice

Released from NYSAES

Characteristics

Moderately hardy

Mod-late budbreak, moderate maturity

Very compact clusters

Small berries, red at maturity

Mod to low productivity

Susceptible to DM

Good flavor, adherent skin, firm texture

Swenson Red

Released by Univ. of Minnesota and Elmer Swenson in 1980

Characteristics

Hardy

Mod-late budbreak, moderate maturity

Large clusters

Medium to large berries, Red at maturity

Mod productive

Susceptible to BR, DM, PM

Seeded, excellent flavor, spicy, adherent skin, firm

Summary

Choose cultivars that are well-adapted and have a good market potential.

Determine the market prior to planting

Design a vineyard management plan to match the needs of each cultivar.