Evaluating Existing Sites for Grapes

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Topics in Vineyard Establishment

- Site Preparation
- Vineyard Layout
- Vine Planting
- Trellis Establishment
- Vine training
- Vineyard floor management
- Fertility
- Pest management

Site Selection Criteria

- Regional and local climatic requirements
  - Meet adequate chilling requirements for variety grown – 300-1000 hours
  - Season length (frost free days).
  - Minimum winter temperatures determine likelihood of cold injury depending on variety
    - Injury to mature vines maximum hardiness may start to occur at minus 5^{o} F and below depending on variety.
  - Slope, aspect, topogrophy

Site Selection Criteria

- A location well-suited for vineyard cultivation (slope).
- Well-drained soils.
- Location that suits the marketing scheme
  - Convenient to wineries, packing facilities, markets.
  - Removed from problem areas for agricultural operations (development pressures, wildlife).
- Sometimes you are better off moving to a new site!

Soils

- Deep - Root penetration and exploration for nutrients and water.
- Well-drained – Roots experience oxygenation, not asphyxiation
- Reasonably Fertile – Good plant growth, economics of fertilizer additions
- Reasonable water-holding capacity
- Free of Pathogens – *Crown Gall*, others unknown

Soil Depth

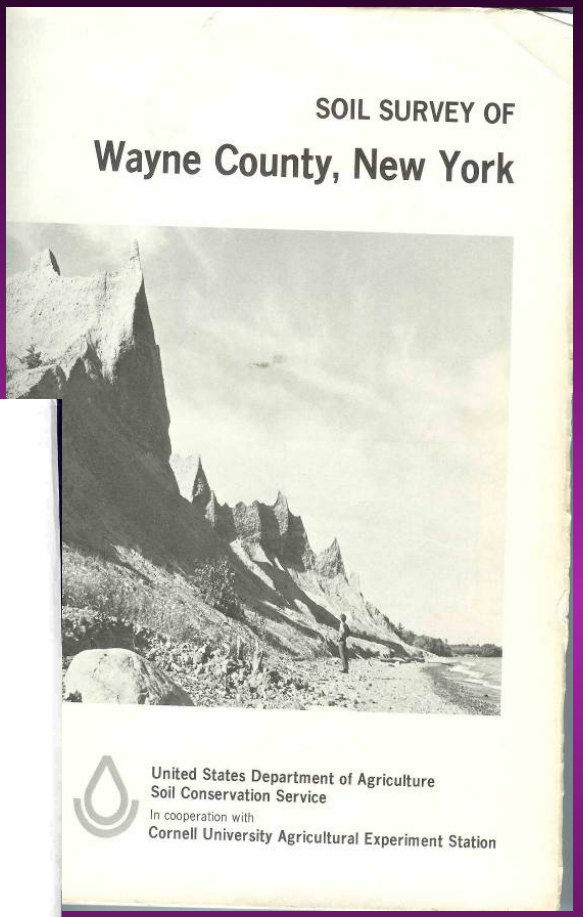
- Bed Rock
- Restrictive Layers
  - Fragipan
  - Plow or Traffic Pan
- Water Table
  - Seasonal
  - Perched
- Rule of thumb - > 36 inches

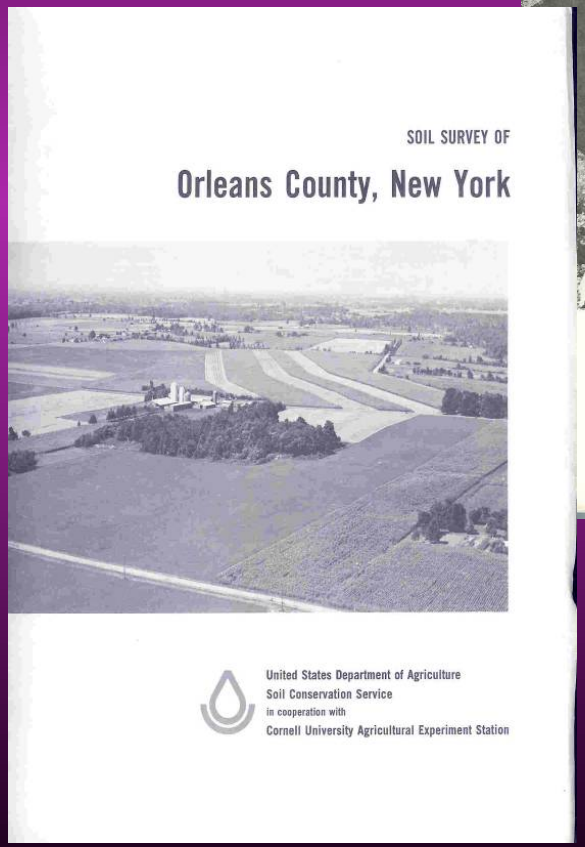
Soil Drainage Problems

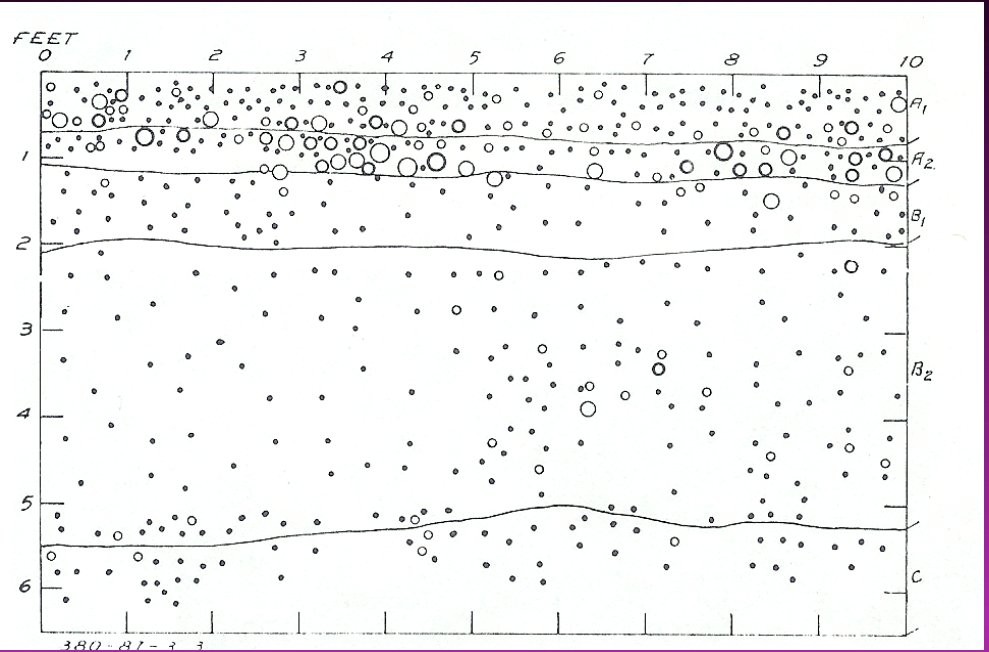
Soil Drainage
is important for grapes

- Well-drained
  - no action
- Moderately well-drained
  - minor improvements
- Somewhat poorly drained
  - improvements needed
- Poorly drained
  - improvements may not be justifiable

Local soil surveys include lots of valuable information including: Specific descriptions for each series and type, potential crop productivity, engineering properties, physical and chemical properties



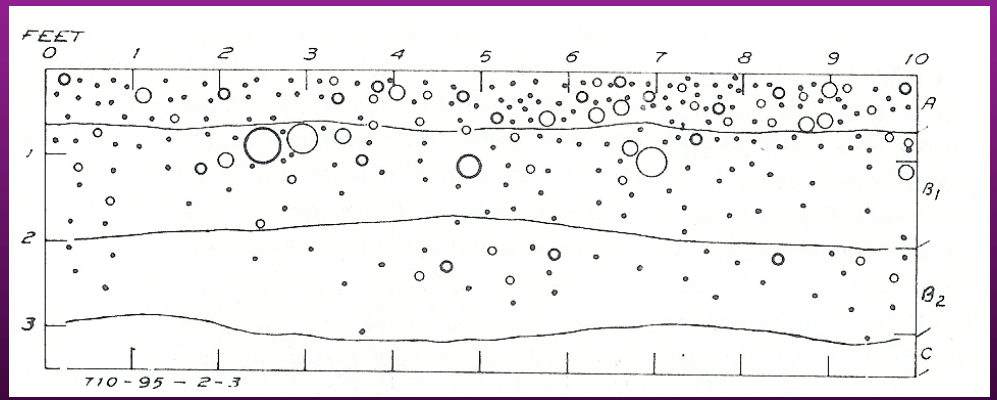




Suitable for fruit. Deep with excellent root distribution and penetration.

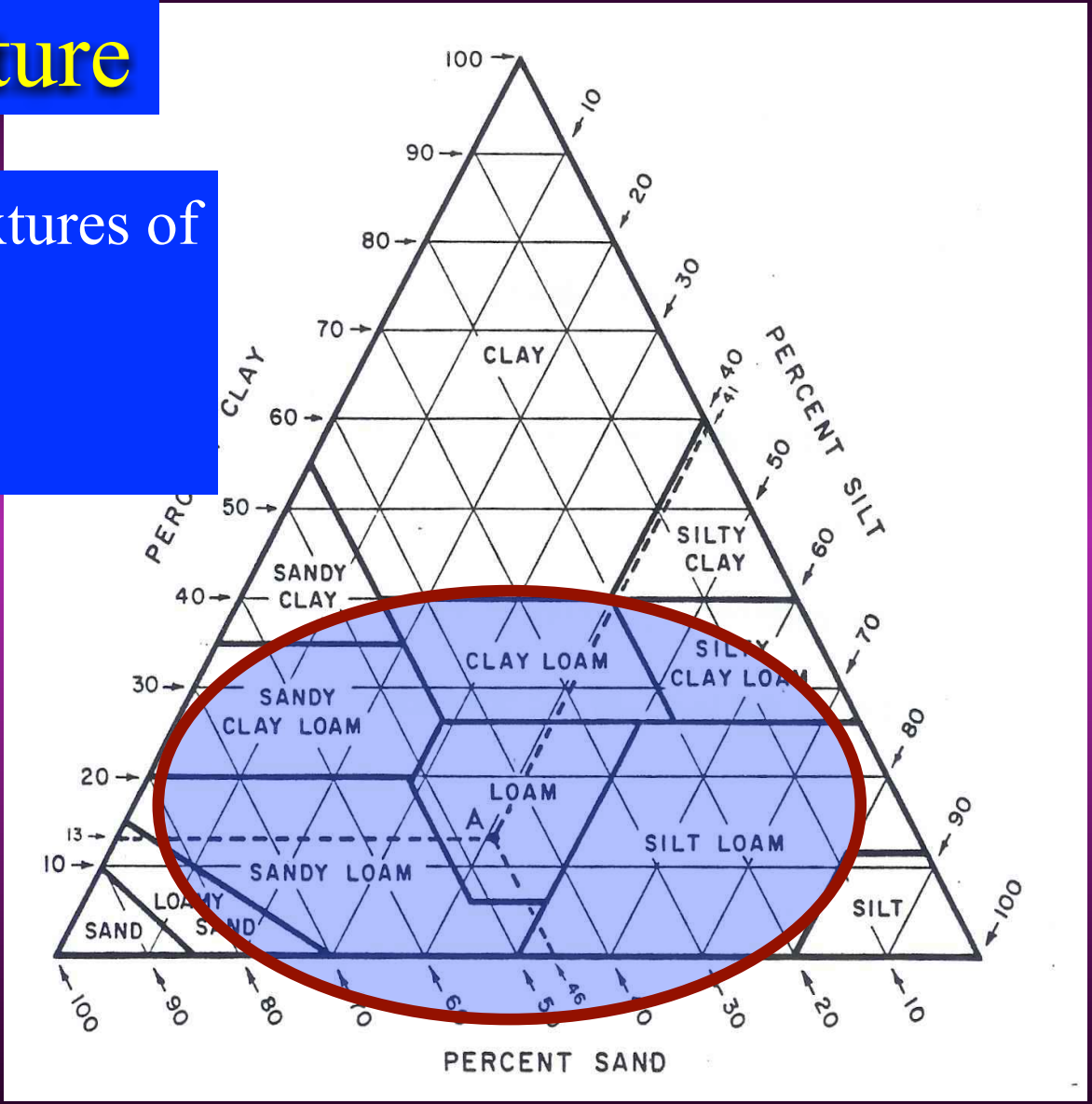
Unsuitable for fruit with poor rooting depth.

Batjer, 1930



Soil Texture

Relative mixtures of
Clays
Sands
Silts



Soil Texture

- Gravel, Cobbles, Shale
  - Soils with a wide range of particle size have better drainage and oxygenation but may be droughty in dry seasons.
  - Organic Matter and Clay improve water-holding capacity of soils. Excessive amounts of clay or pans promote poor drainage during wet periods.
  - Phase changes may be a problem

The selected site although mapped with potentially good soils may still not be suitable!

- Be sure do a careful physical examination.
- Evaluate existing vegetation
  - Poor or sparse weed growth
  - Wetland trees – willows
  - Significant #’s missing vines in existing vineyard.

- Check Temperatures!

Dig a Soil Test Pit

Consult Resources:

Soils Maps - County Soil Survey

Natural Resources Conservation Service

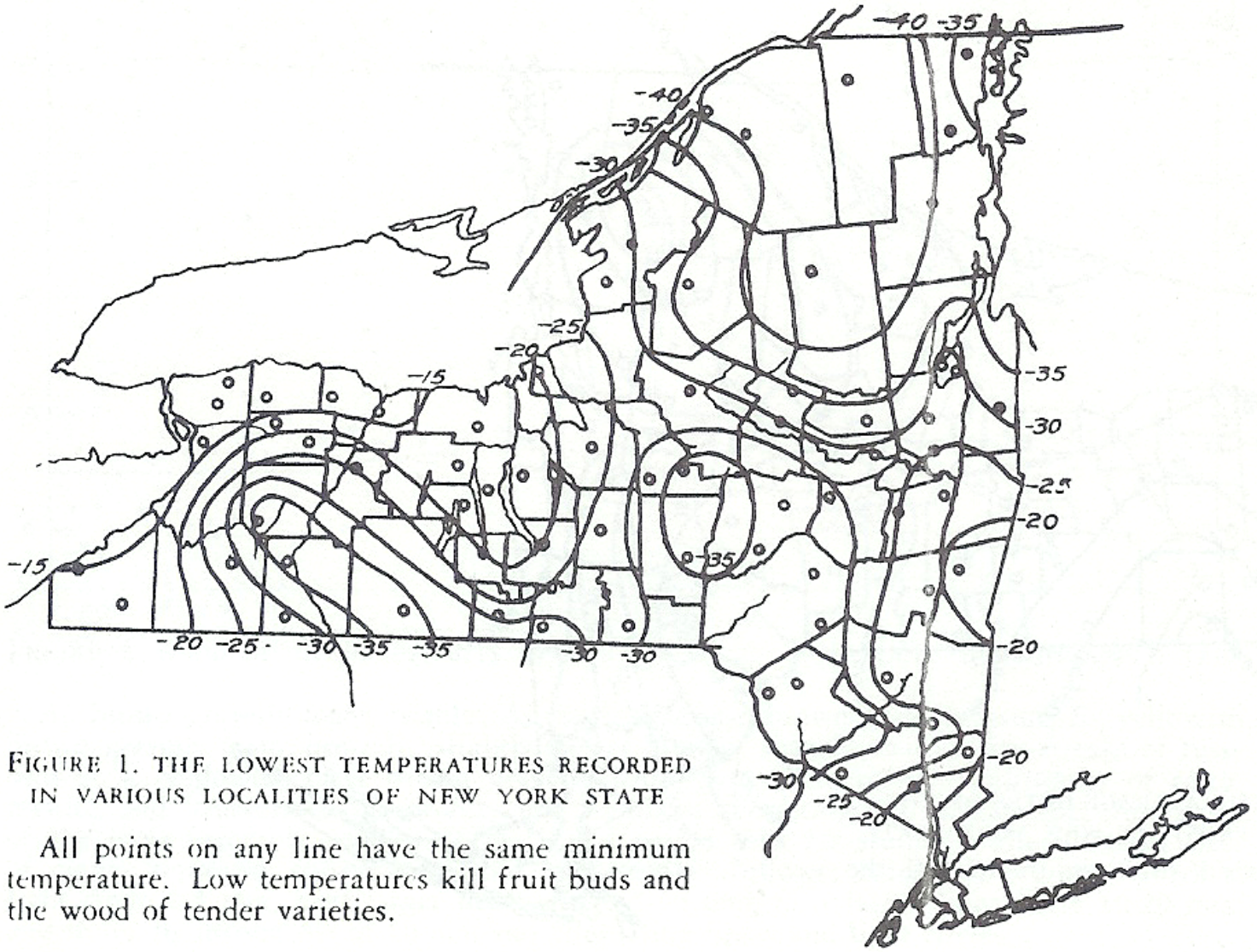


FIGURE 1. THE LOWEST TEMPERATURES RECORDED IN VARIOUS LOCALITIES OF NEW YORK STATE

All points on any line have the same minimum temperature. Low temperatures kill fruit buds and the wood of tender varieties.

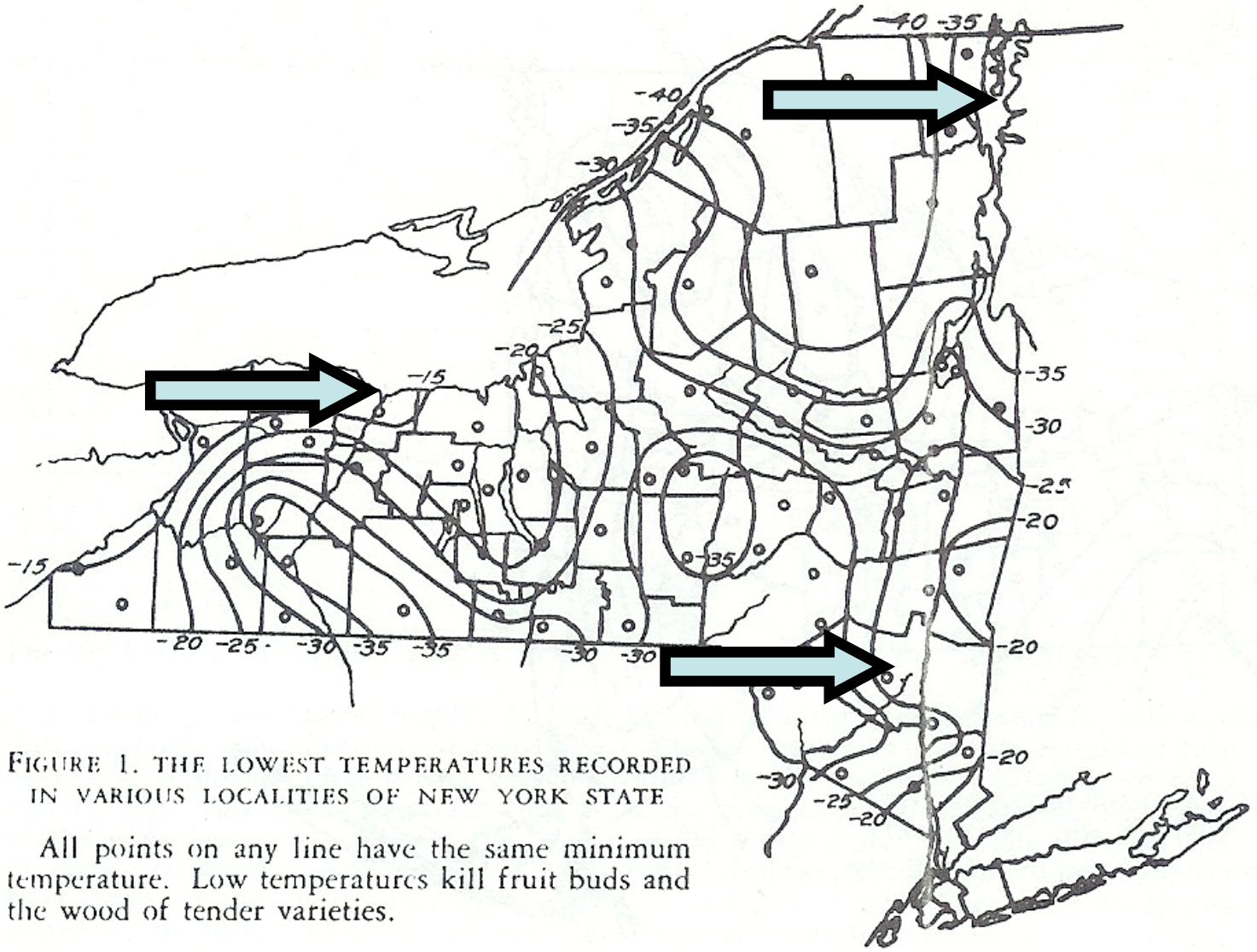


FIGURE 1. THE LOWEST TEMPERATURES RECORDED IN VARIOUS LOCALITIES OF NEW YORK STATE

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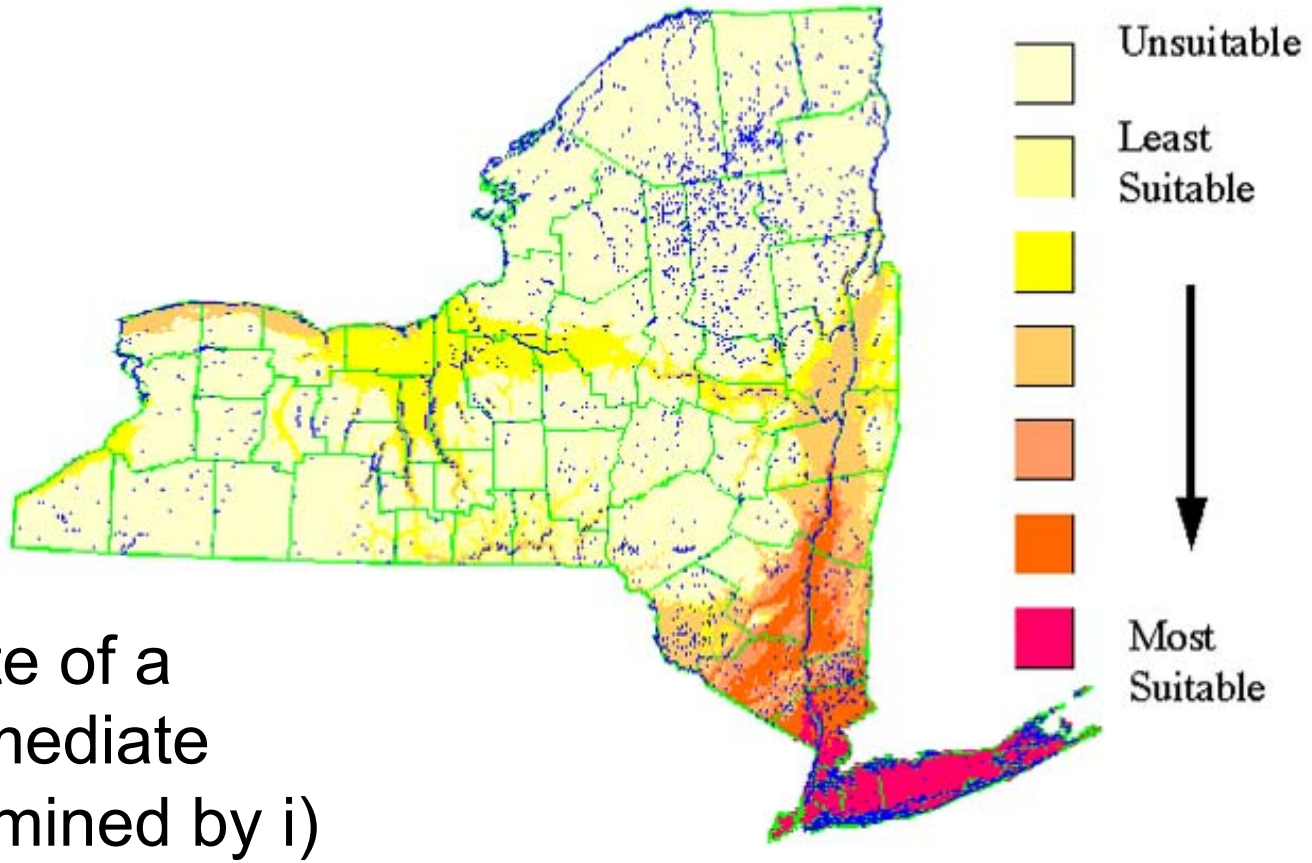
New York Climatic Suitability Map.



The general climate of a region in the intermediate latitudes are determined by i) latitude; ii) altitude; iii) distance and direction from large bodies of water; and iv) location in respect to the normal path of storms.

Date	Variety	BUD10 °F	BUD50 °F	BUD90 °F	PH10 °F	XYL10 °F
Feb 8	Cabernet Sauvignon	-8	-11	-13	0	-7
Feb 6	Cabernet Franc	-6	-10	-13	+1	-3
Feb 5	Merlot	-6	-9	-14	+1	-3
Feb 7	Malbec	-4	-8	-12	+4	-6
Feb 5	Riesling	-12	-14	-16	-4	-9
Feb 13	Viognier	0	-5	-9	+1	-6
Jan 5	Lemberger	-6	-8	-11	-6	-11
Feb 6	Grenache	-7	-10	-13	+2	-3
Feb 8	Chardonnay	-9	-12	-13	+4	-7
Feb 7	Sangiovese	-3	-8	-11	+1	-4
Feb 6	Nebbiolo	-7	-9	-12	+3	-6
Feb 5	Concord	-14	-17	-20	-9	-18

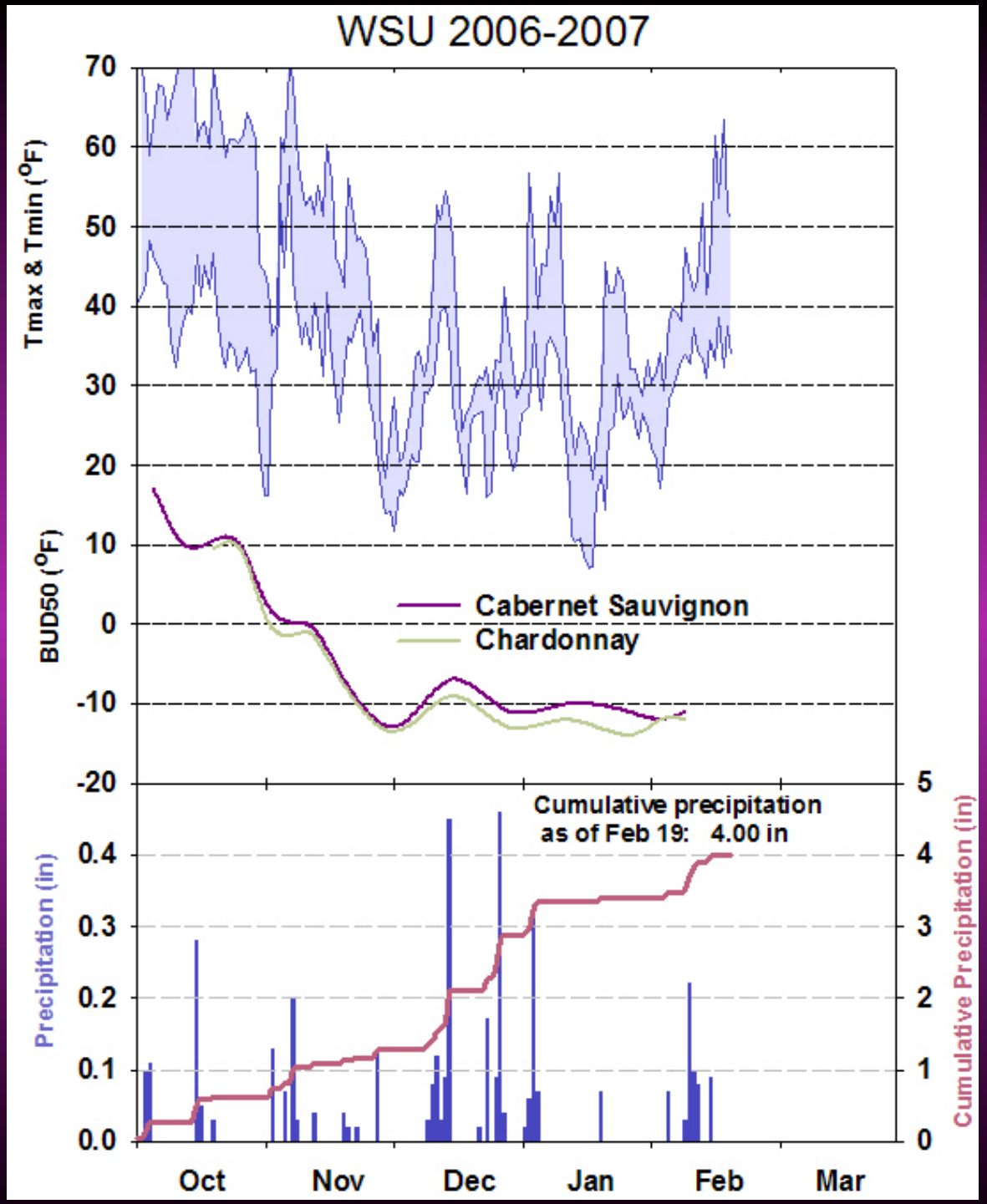

WSU 2006-2007
Tmax & Tmin (°F)
70
60
50
40
30
20
10
0
-10
-20
BUD50 (°F)
Cabernet Sauvignon
Chardonnay
Cumulative precipitation
as of Feb 19: 4.00 in
Precipitation (in)
0.4
0.3
0.2
0.1
0.0
5
4
3
2
1
0
Cumulative Precipitation (in)
Oct
Nov
Dec
Jan
Feb
Mar

TABLE 3

Mid-winter low temperatures and hazard to grapevines.

If low temperature is higher than:	Injury hazard is:	Suitable Varieties
0°F	Very low	Almost any
-5°F	Low	Most northern vinifera
-10°F	Moderate	Hardy vinifera/ moderately hardy hybrids
-15°F	High	Hardy hybrids/most Native varieties
< -15°F	Very high	Hardy Native varieties

Martinsen, 2000

Year	Month	Min. Temp	< 0 deg	<-5 deg	<-10 deg
1997	January	- 2F	1	0	0
1998	January	+3F	0	0	0
1999	January	- 2F	1	0	0
2000	No data				
2001	January	- 5F	2	0	0
2002	January	+5F	0	0	0
2003	Jan, Mar.	- 9F	6	5	0
2004	January	- 4F	3	0	0
2005	January	- 11F	5	4	2
2006	January	+ 1F	0	0	0

@ Poughkeepsie Airport

Risk of Winter Injury (at the airport!)

- 4 years out of 10 do not go below 0°F
- 6 years out of 10 are below 0°F
- 2 years out of 10 are below -5°F
- 1 year in 10 are below -10°F


Property of (Geneva) 693 6737
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Accel®
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9mm
10mm
12mm
14mm
16mm
21mm
24mm
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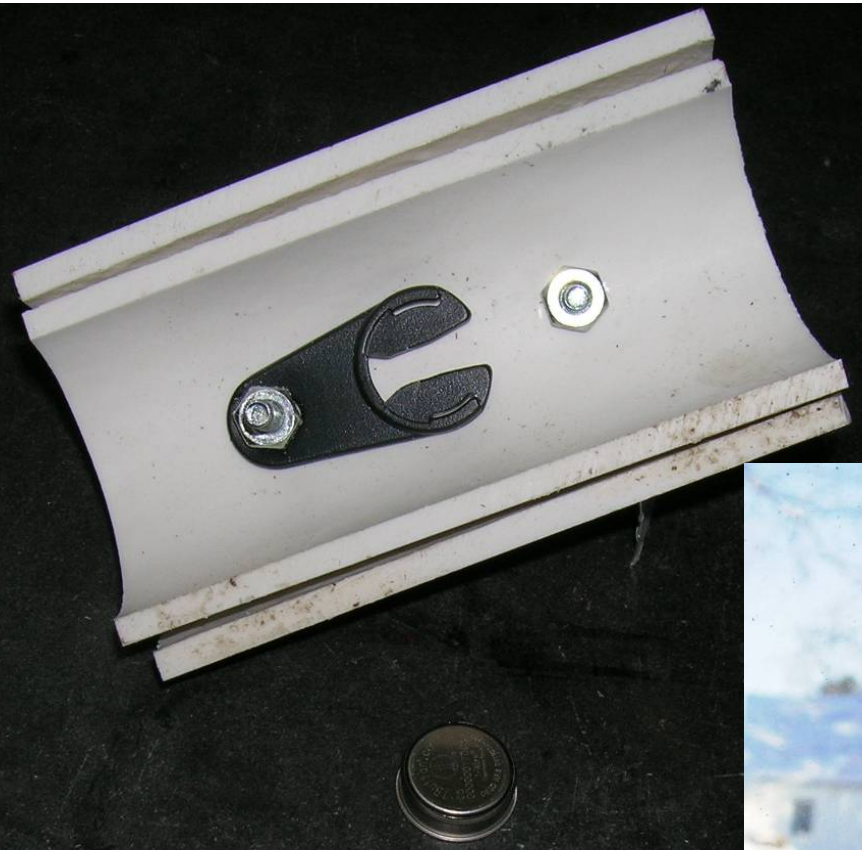

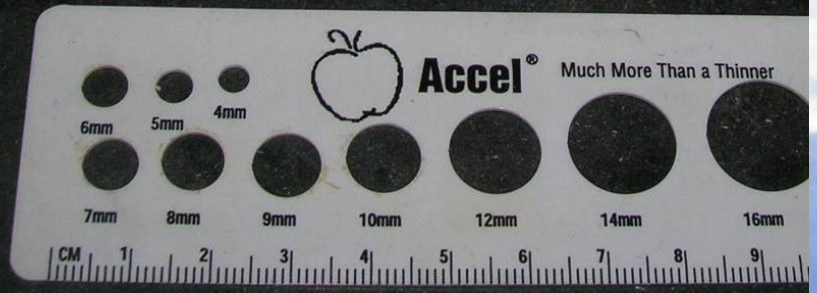
Accel®
Much More Than a Thinner
6mm
5mm
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12mm
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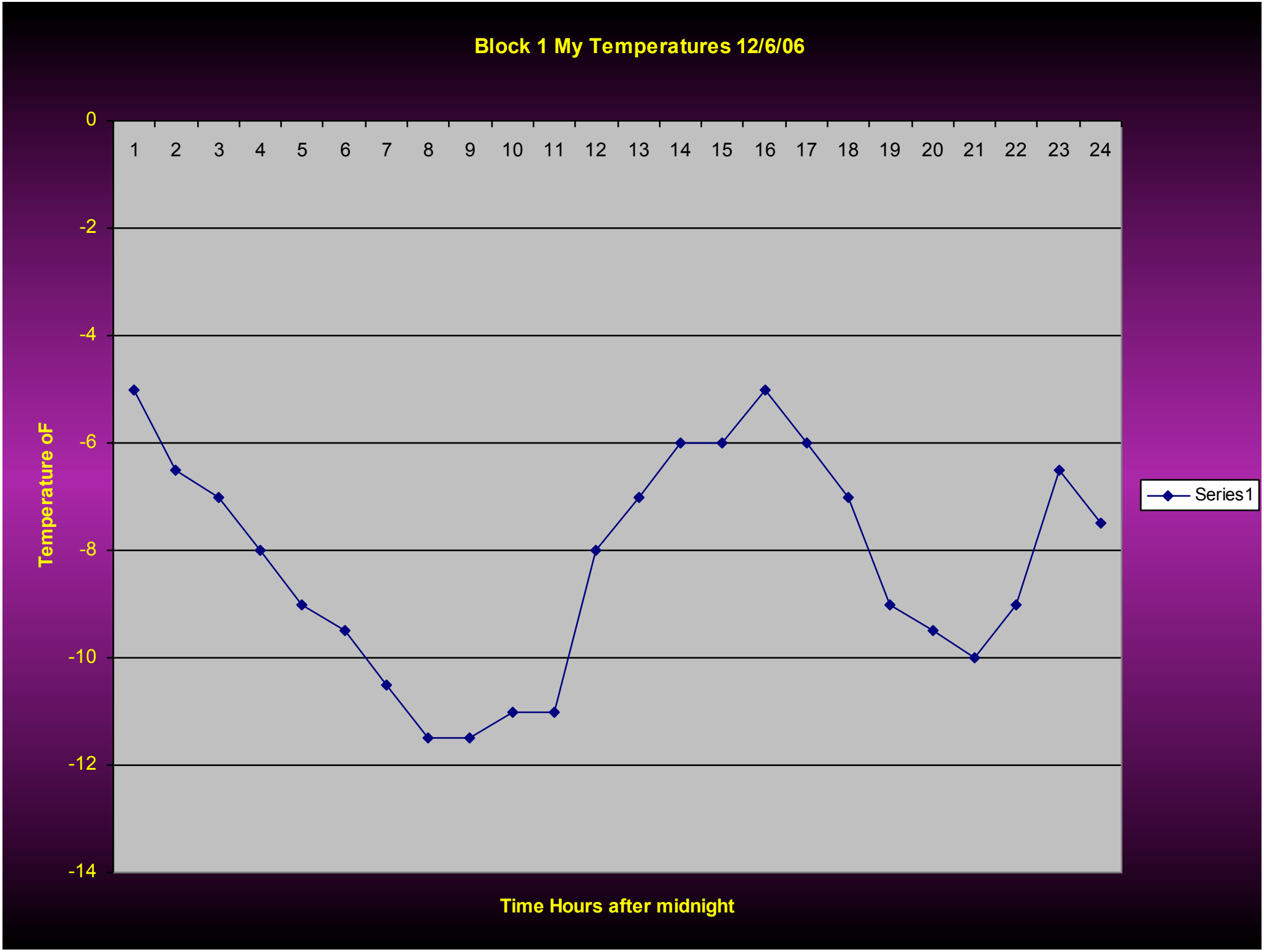
16mm
CM 1 2 3 4 5 6 7 8 9


80
60
40
20
0
20
40
°C
°F
SPRINGFIELD

$12.00


Block 1 My Temperatures 12/6/06
0
-2
-4
-6
-8
-10
-12
-14
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Temperature oF
Time Hours after midnight
Series1

Assessing Temperatures

- Put thermometers in field in more than one location – apparent best and apparent worst. Away from the house or barn!
- Compare to reliable local data such as airport or university climate center
- Examine temperature history as far back as possible and calculate likely low temps

SITE MODIFICATIONS

Leveling

Contouring

Terracing

Drainage modification

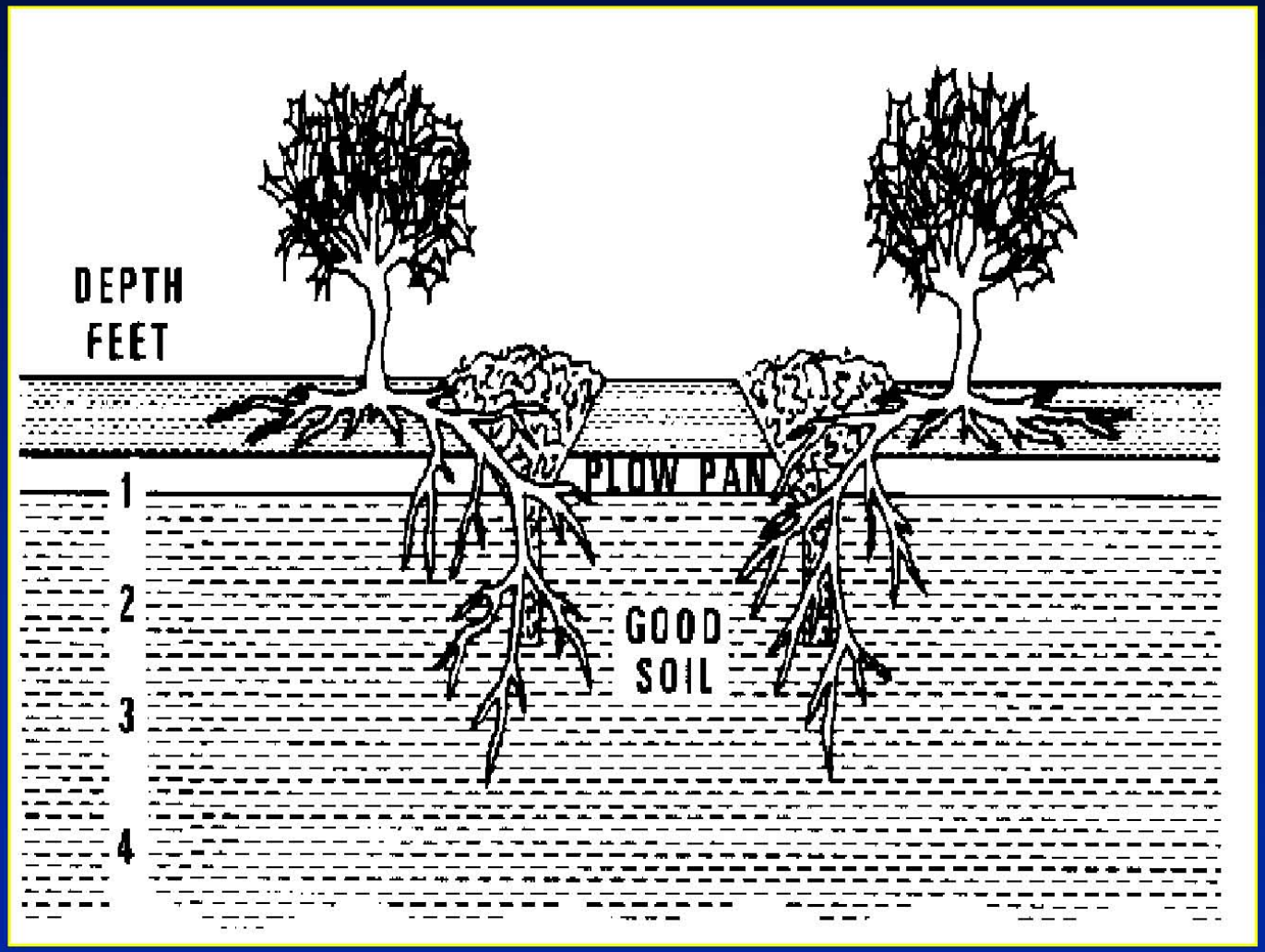
Consult Experts

- Soil Conservations Service (FSA)
- Cooperative Extension Specialists
- Private Consultants
- Local Growers

Soil Preparation
Sub-soiling

Only effective if soil has hard pan or similar structure with good soil beneath

Effective Subsoiling



Supplemental Drainage

Soil Drainage allows roots to grow deeply

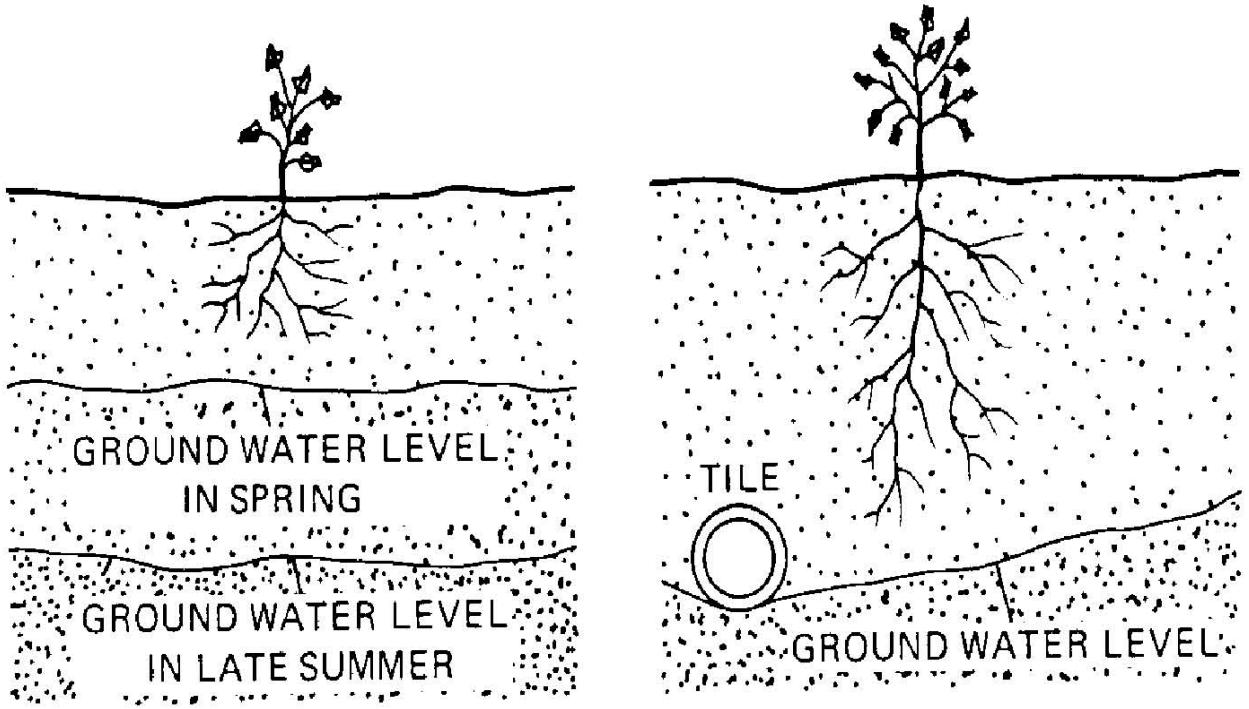


FIGURE 9:11. (*Left*) Root zone restriction that occurs when natural drainage is too slow. (*Right*) Lower water table and enlarged root zone that are developed by a properly installed tile drain.

Berming

Site Preparation

Major Improvements Prior to Planting

- Clearing, root, and rock removal
- Leveling and terracing
- Road building
- Irrigation system, well, etc.

Very important tasks to do 1 year before planting

- Drainage Improvement
- Soil Testing and Amendment
- Weed Control - Cover Crops

pH and Nutrient Additions

- Soil tests
  - pH amended appropriate levels
  - Immobile nutrients such as Phosphorous and Calcium should be added preplant

Soil Amendments

- ✓Preplanting Marigolds, Saia Oats, Rape (Brassica), Wheat, Sudex, or other agronomic crop
  - ✓Nematode supression
  - ✓Organic matter addition
- ✓Weed Control and Soil Working

Use Adapted Rootstocks to Overcome *Minor* Soil Problems

Table 2. Important grape rootstocks, their species background, and their resistance to biotic and abiotic soil-borne stresses.*

Rootstock	Breeder/ selector	Species	Scion vigor	*Phylloxera* resistance	Nematode resistance	Drought resistance	Lime resistance	Salt resistance (g/l)
Riparia Gloire	Portalis	*V. riparia*	2	5	2	1	6 %	0.7
Rupestris St. George	Sijas	*V. rupestris*	4	4	2	2	15 %	-
420 A	Millardet	*riparia* x *berlandieri*	2	4	2	2	20 %	-
5 BB	Teleki, Kaber	*riparia* x *berlandieri*	4	4	3	1	20 %	-
SO 4	Teleki	*riparia* x *berlandieri*	4	4	4	1	17 %	-
5 C	A. Teleki	*riparia* x *berlandieri*	3	4	4	1	17 %	-
161-49 C	Couderc	*riparia* x *berlandieri*	1	4			25 %	-
110 R	Richter	*rupestris* x *berlandieri*	3	4	2	4	17 %	-
99 R	Richter	*rupestris* x *berlandieri*	4	4	3	2	17 %	-
140 Ru	Ruggeri	*rupestris* x *berlandieri*	4	4	3	4	20 %	-
1103 P	Paulsen	*rupestris* x *berlandieri*	3	4	2	3	17 %	0.6
3309 C	Couderc	*riparia* x *rupestris*	3	4	1	1	11 %	0.4
3306 C	Couderc	*riparia* x *rupestris*	3	4	1	1	11 %	0.4
101-14	Millardet	*riparia* x *rupestris*	2	4	2	1	9 %	-
44-53 M	Malegue	*riparia* x *rupestris* x *cordifolia*	3	4	4	2	10 %	-
1616 C	Couderc	*riparia* x *Solonis*	2	3	1	1	11 %	0.8
1202 C	Couderc	*rupestris* x *vinifera*	3	2	1	2	13 %	0.8
AXR #1	Ganzin	*rupestris* x *vinifera*	4	2	1	2	13 %	0.8
41 B	Millardet	*Berlandieri* x *vinifera*	2	4	1	3	40 %	very sensitive
333 EM	Foex	*Berlandieri* x *vinifera*	1	2	1	2	40 %	very sensitive
1613 C	Couderc	Solonis x Othello†	3	2	4	2	low	-
Dogridge	Munson	*V. champini*	4	2	4	2	unknown	-
Salt Creek	unknown	*V. champini*	4	2	4	2	unknown	-
Harmony	Weinberger & Harmon	1613 C x Dogridge	2	2	4	2	unknown	-
Freedom	Cain	1613 C x Dogridge	3	2	4	2	unknown	-

* Vigor scale: 5 = most vigorous, 1 = least vigorous; resistance scale: 5 = very resistant, 1 = very susceptible. After Howell (see Additional Reading, page 21).

† Othello = *V. labrusca* x *V. riparia* x *V. vinifera*

(-) No data available.

Don’t be afraid to reject a site! Successful and profitable production may require finding new land or delaying planting!