I. Decide what area to plant to vines.

- Row orientation
  - North to south preferred for sunlight interception
  - Topography can alter the decision
I. Decide what area to plant to vines.

- **Row orientation**
  - North to south preferred for sunlight interception
  - Topography can alter the decision
  - Field dimensions can alter the decision

- **Row length**
  - No limit with regard to engineering
  - Limitations due to efficiency of access
I. Decide what area to plant to vines.

• **Row width**
  – Functional height of trellis should not be less than a 1:1 ratio with width of the row.

![Row width diagram]

*Row Width = W

A value of 1.5 for the ratio of canopy height to distance between canopies across a useful size of field is usual for this situation. In non-Campbell vineyards, the trellis canopies are too widely spaced than this above average, and much variation is related to the wind and width of canopies used in these vineyards, currently 2.0 m or wider. For such vineyards, shading is generally provided by a mixture of canopies, rather than canopy structure.


![Larry Mawby showing the group his vineyard]
I. Decide what area to plant to vines.
   • Headlands – 30 foot minimum
I. Decide what area to plant to vines.

- Headlands – 30 foot minimum
- Alleyways – 25 foot minimum
I. Decide what area to plant to vines.

- Headlands – 30 foot minimum
- Alleyways – 25 foot minimum
- Access roads

II. Decide what area to plant to vines.

- Special needs
Vineyard Site Preparation
Part 2 – Remove Obstacles

Hedges or wooded areas below a vineyard prevent cold air from draining downhill.

Hedges or woods upslope from vineyard block cold air from entering a vineyard.
Hedges or woods upslope from vineyard block can delay cold air entering vineyard.
Vineyard Site Preparation
Part 4 - Modification of Soil
Internal Drainage
“Berms” under trellis in extremely wet areas.

Vineyard Site Preparation

Part 5 – Modification of Soil Chemistry
Vineyard Soil Chemistry

There are two fundamental reasons for obtaining a soil test prior to planting grapevines:
(1) Determine soil pH for possible modification
(2) Determine soil potassium level for possible modification

Soil Chemistry for Vineyards

- Grapevines grow well over a middle range of soil pH from 5.5 to 7.0
- Soil pH values above and below that range can be a problem.
- Optimum soil pH values depend on the varieties being grown.

Vineyard pH Target Ranges for new vineyard plantings

<table>
<thead>
<tr>
<th>Variety Type</th>
<th>Desired Soil pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native</td>
<td>5.0 to 5.5</td>
</tr>
<tr>
<td>Hybrid</td>
<td>6.0 to 6.5</td>
</tr>
<tr>
<td>vinifera</td>
<td>6.5 to 7.0</td>
</tr>
</tbody>
</table>
Table 1. Lime (tons/acre) required to raise soil pH to 6.0.*

<table>
<thead>
<tr>
<th>Soil type</th>
<th>Initial pH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.0</td>
</tr>
<tr>
<td>Sand</td>
<td>2.5</td>
</tr>
<tr>
<td>Loamy sand</td>
<td>3.0</td>
</tr>
<tr>
<td>Sandy loam</td>
<td>4.0</td>
</tr>
<tr>
<td>Loam</td>
<td>5.0</td>
</tr>
</tbody>
</table>

*rates based on calcium carbonate equivalent.

Soil Potassium Level

If soil potassium is below 200 lbs/acre, apply potassium fertilizer by banding it along vine rows after planting according to the following table.

Table 2. Preplant K recommendations for vineyards.

<table>
<thead>
<tr>
<th>Soil test (ppm)</th>
<th>Recommended lb K₂O/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>200</td>
</tr>
<tr>
<td>40</td>
<td>175</td>
</tr>
<tr>
<td>60</td>
<td>125</td>
</tr>
<tr>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>120</td>
<td>0</td>
</tr>
</tbody>
</table>

*To convert to lb/acre, multiply by 2.
Soil Chemistry for Vineyards

• Any adjustments to soil pH should be done before planting.
• Any adjustments to soil potassium (potash) levels should be done after planting.
• Other nutrients to include magnesium, manganese, iron and boron are occasionally deficient in Michigan vineyards but they are of minor concern almost all the time.

Vineyard Site Preparation

Part 6 – Weed Control

Weed control is at the top of the list of vineyard site preparation tasks.

Remove all woody perennials
Vineyard Site Preparation

Part 6 – Weed Control
Herbaceous Perennials

Fall application of glyphosate
Quackgrass in corn field in early spring

Vineyard Site Preparation

Part 6 – Weed Control
Annuals
SNAPSHOT (SURFLAN + GALLERY) WAS APPLIED IN A BAND AROUND NIAGARA VINES AT THE TIME OF PLANTING.
What do nematodes do to grapevines?

(1) Transmit virus diseases
   - Tomato ringspot virus
   - Tobacco ringspot virus

(2) Feed on grapevine roots
Statements about nematodes and grapevines

1. Nematode infestations can be devastating to grapevines. When problems occur it is most often a matter of weakened, small, low-yielding vines.

   Sometimes nematodes lead to death of vines.

2. Several viticultural regions pay little or no attention to nematode problems in grapevines and most vineyards don’t seem to suffer from that neglect.

   There are occasional exceptions!
Statements about nematodes and grapevines
(3) Fallowing sites for two or more years with grass cover crops (sudan or sudex preferred) can reduce risks of nematode problems.

(4) When a site is infested with root-knot nematode, fumigation will be ineffective, there is no possibility of eradication, but cover cropping can help.

Root-knot nematode does not "travel" on a site.

(5) There are many nematode-resistant rootstocks most of which have not been evaluated under Michigan conditions.

Rootstock 5C has performed well at SWMREC.
Statements about nematodes and grapevines
(6) Be especially concerned about a vineyard site that has been previously cropped with a perennial crop (orchard or vineyard) and has exhibited areas of weak plant growth.

Statements about nematodes and grapevines
(7) If there is a reason to take a nematode sample for analysis, do so before the current perennial crop is removed because the sample must be taken with roots and soil immediately adjacent to the roots.

Statements about nematodes and grapevines
(8) Movento, a relatively new insecticide, offers a new strategy for controlling nematodes in new and existing vineyards.
Vineyard Site Preparation

Part 8 – Irrigation for a New Vineyard

Is irrigation needed in a new Michigan vineyard?

**Michigan Precipitation**

+/- 32 inches per year
rather evenly divided year round
actually somewhat less in winter
~ 50% probability of ~3" rain each month of the growing season

![Graph of cane prunings for 'Niagara' grapevines after two growing seasons.](image)

Treatment Number       1   2    3    4             5    6   7    8             9  10  11  12           13  14 15 16

- Weed Control
- Nitrogen Fertilizer
- Irrigation
- Pruning Severity

Fig. 4: Weight of cane prunings for 'Niagara' grapevines after two growing seasons. Vines subjected to combinations of weed control under the trellis, nitrogen fertilization, irrigation and pruning severity. Mean separation according to Fisher’s test for least significance. $P < 0.05$, LSD = 0.22.
THE START OF THE SECOND GROWING SEASON IN A NEW NIAGARA VINEYARD – 6/18/91

[Images of vineyard and irrigation system]
Vineyard Site Preparation

Part 9 – Deciding on the Number of Vines to Order

A measuring wheel that can be used to quickly measure distances between stakes that outline the area to be planted.

For more modern people, I suppose GPS units can also do this very nicely!!!
Surface Erosion Statistics

- 1 acre-inch of water = 27,154 gallons
- So on 10 acres:
  - A 1-inch rainfall = 271,154 gallons
  - A 2-inch rainfall = 543,608 gallons
  - A 3-inch rainfall = 814,620 gallons
  - A 4-inch rainfall = 1,086,160 gallons

* The volume of the St. Joseph, MI YMCA Olympic-size swimming pool is about 180,000 gallons.
Vineyard Site Preparation
Part 11  – Cropping History of the Site

Cropping History of the Site
Herbicide carryover - Corn
Nutrient levels – Alfalfa and low potassium
Disease – Peach and Peach Rosette Mosaic Virus
Orchards and Vineyards – Nematodes, Phylloxera

Most of the time these are not issues.

SUMMARY
Thankfully, not all the tasks listed above need to be performed on all vineyard sites.

However, all vineyard sites need some site preparation so that the resulting vineyard has the very best opportunity for rapid establishment and long-term productivity.
Numero Uno

WEED CONTROL

THANK YOU FOR YOUR ATTENTION