Vineyard Site Preparation

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A Multi-Component Process

- Site assessment
- Design and layout
- Large scale operations
- Final preparations
Site Assessment - Basics and Background Questions

- What cultivars will be grown?
- Will an irrigation system be required?
- Are there any nematode issues?
- Are there any herbicide residues?
Site Assessment - Basics and Background Questions

- Is there a need to remove trees?
- Will re-shaping of the site be done?
- Is the site at risk for soil erosion?
- How soon do you intend to plant?
Vineyard Design and Layout

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

- **Row length**
  - No limit with regard to engineering
  - Row length may be influenced by efficiency of access
Vineyard Design and Layout

- **Row width**
  - Row width should not be less than the planned height of the trellis
  - Equipment issues may also influence row width
for the ratio of canopy height to distance between canopies seems a useful rule of thumb in shading. In non-European vineyards, grapevine canopies are too widely spaced, and much radiation is wasted by falling on the inter-row soil. This is a problem of canopy interiors, rather than canopy exteriors.

8-foot tall trellises of Cabernet franc at the MSU Southwest Michigan Research & Extension Center.
Vineyard Design and Layout

- **Vineyard Access**
  - Headlands – 30 foot minimum
  - Alleyways – 25 foot minimum
  - Access roads
  - Special needs
Large Scale Operations

- Tree removal
- Topography changes
- Surface & subsurface drainage
Tree Removal

• Be aware of spreading tree diseases
• Remove root systems
Cold Air Sinks and Flows Downhill

- Very important during spring and fall frosts
Cold Air Sinks and Flows Downhill

- Very important during spring and fall frosts
At this point, you may be wondering why you got yourself into this...
Topography Changes

- Modifying slopes
- Preparing drives and access areas
Modify Soil Internal Drainage
Drainage Improvement Options

- Deep tillage to break up hardpan
- Subsurface tiling systems
- Forming berms for planting
Ground water level in Spring:

Ground water level in late Summer

Tile

Ground water level
Control Surface Water
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 = 543,080 gallons
  - A 3-inch rainfall = 814,620 gallons
  - A 4-inch rainfall = 1,086,160 gallons

* The volume of a YMCA Olympic-size swimming pool is about 180,000 gallons.
Modifying Soil Chemistry & Biology

- pH adjustments
- Nutrient applications
- Soil amendments
- Cover crops for soil improvement and erosion control
- Cover crops for nematode management
Modify Soil Chemistry
Soil tests for determining:

Soil pH

Soil nutrient levels

Organic matter content

Recommendations for cover crops and grapevine nutritional needs
Soil pH

- Grapevines grow well over a middle range of soil pH from 5.5 to 7.0.

- Optimum soil pH values depend on the varieties being grown.
<table>
<thead>
<tr>
<th>Variety Type</th>
<th>Desired Soil pH</th>
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<tbody>
<tr>
<td>Native</td>
<td>5.5 to 6.0</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>
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</tbody>
</table>
To increase soil pH, apply lime
  – reacts slowly, should be applied a year ahead of vine planting

To decrease pH, apply Sulphur
Soil Phosphorus Level

If soil tests indicate phosphorus is needed, make broadcast applications during site preparation.
If soil potassium is below 200 lbs./acre, apply potassium fertilizer by banding it along vine rows after planting.
Cover Crops Can Provide

• Erosion control
• Soil improvement
• Nematode management
• Weed management
Consider the Threat of Nematodes
What do nematodes do to grapevines?

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

(2) Feed on grapevine roots
Nematodes and Grapevines

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.
Nematodes and Grapevines

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.
Nematodes and Grapevines

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

Fallowing sites for two or more years with grass cover crops (sudan or sudex preferred) can reduce risks of nematode problems.
Weed Control

Lack of weed control is the most common cause poor vineyard establishment.
Fall application of glyphosate
WEEDY CONTROL TREATMENT

“ROUNDUP RESISTANT” SOYBEANS

THE INFLUENCE OF COVER CROPS ON VINEYARD SITE PREPARATION
WEEDY CONTROL TREATMENT

“ROUNDUP RESISTANT” SOYBEANS

THE INFLUENCE OF COVER CROPS ON VINEYARD SITE PREPARATION
Wow, you have come a long way!
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
Consider Temporary Irrigation for a New Vineyard
A listing of supplies needed to construct a temporary irrigation system for one acre of vineyard.

800 feet thin wall 1" polyethylene tubing ($0.18/ft) = $144.00

108 feet thin wall 1" poly tubing for header ($0.18/ft) = 19.44

4800 feet T-tape ($0.0157/ft) = 75.36

12 valve tape x barb ($1.70 ea) = 20.40

1 15 psi pressure regulator (2 - 20 gpm) = 10.26

Misc. plugs, bushings, barb x thread adapters, etc. = 10.00

1" PVC ball valve = 6.38

$141.84
SUMMARY

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

However, all vineyard sites need thoughtful site preparation so the grower has the best opportunity for rapid establishment and long-term productivity.
THANK YOU FOR YOUR ATTENTION