Trellis Construction Basics
Steve Lerch, Cornell University

- Install before or after plants?
- Irrigation? Drain tile?
- Wire Positions?
- End Assemblies?

- Use Only Highest Quality Materials Available
- Posts - Line and End: deep enough, tall enough
- Right Equipment for Installation
Some Common Training Systems

Low Cane/Cordon

VSP
Divided Canopies

Geneva Double Curtain

Smart-Dyson

Lyre
High Wire Systems

Figure 2. Four-arm Kniffin training system.

Figure 3. Umbrella Kniffin training system.
Trellising Systems

- All of these systems have some elements in common!
  - Posts
  - Wire
  - Anchor/Bracing systems
How to posts:

- Drive posts, try not to set in augered holes.
- Typically 3 - 4” 8’ PT Yellow Pine/Lodgepole Pine.
- Line posts: 2’ minimum deep, remainder above.
- FL standard is 24’ feet between posts.
- All must be same height (hedger, harvester).
- End posts: min 5 - 6” 8’, 3’ deep.
- Should be angled out, up to 60 degree angle.
Auguring end post holes
Post Pounding
Steel Posts
Can exclusive use of steel posts be a problem?
How to - Anchors:

- Screw in Anchors - screw in straight down with auger or steel bar.
  - Or bury (not as good), always to eye depth.
  - Anchor wires: white pvc tubes for visibility.
- Pounded Post Anchors - min 5 - 6”, 7’, 4’ deep.
  - MUST be pounded.
- Duck bill type anchors
  - Must be driven with a special tool.
Earth Anchors
How to - Wire:

- Standard – 12.5 gauge high tensile
- Wire Source - packed and wound under tension!
- Wire: use a spinning jenny to apply.
- Splice correctly.
- Leave enough length at ends to work with!
- Tie offs:
  - Compression sleeve
  - Gripples
  - Wire gripper/vice through hole in post
  - Double wrap with staple
- Strainers - only need on wire carrying fruit loads.
How to - Wire (continued):

- Staples in wood posts -
  - 1.75” minimum.
  - Don’t drive tight!
  - Top wire on top of posts?
- Proprietary fasteners for steel -
  - Pre-bent wires/ clips.
  - Some posts have pre-formed wire slots.
How to - Catch Wires:

- Many people use 14 ga.
- Moveable
  - Ends are problematic.
  - Chains
  - Strainers
  - ?
- Fixed
  - Can be more time consuming.
  - More shoot damage.
Spinning Jennies
Wire Gripping Tools
Crimping Sleeves
Wire Gripping Devices
In-line Wire Strainers
On-line Wire Strainers
Bracing Systems
Angled End Post

**Anchored End Post System with an Earth Anchor**
Suitable for rows up to 600 ft, but this is affected by soil texture and anchor's helix diameter.

- 5' x 10' end post
- 6' tall

**Anchored End Post System with a Tie-back Post**
Suitable for rows up to 600 ft. Cost of materials will often determine whether an earth anchor or tie-back post is used.

- 3-4" x 8' line post
- 6' tall
- 60°

- Earth anchor 4-6" helix x 45°
- 2' deep
- 3 - 4' deep
Angled End Post
What not to do.

Trellis System of training the apple trees for HDP
Angled End w/ Screw-in Anchor
Angled End w/ Screw-in Anchor
“H” Brace
“H” Brace
What not to do.
Angled Brace
Angled Brace
Angled End w/ Driven Post

- **Line Posts**: 8' x 3" driven 2 FT.
- **End Post**: 10' x 4" driven 4 FT.
- **Tie-Back Post**: 6' x 5" driven 4-5 FT.
- **In-Line Wire Strainers**
- **Plumb Line**
- **Double Stapling**
Pruning Fundamentals
Prior to the Your First Cut

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Know the Vine

- Trunk
- Sucker
- Head Area
- Persistent Lateral Cane
- Node/Bud
- Internode
- Cordon
- Arm
- Area
Know the Cultivar

- Cold Tolerance
- % Fruitfulness on Secondary Buds
- Average Cluster Size
- Fruitful Basal Buds?
- Early or Late Budbreak?
- Upright, Trailing, or Indeterminate Growth Habit
Get Trunk(s) & Cordons Established in First 2 Years

Grapevine Through Year 2

A
At Planting

B
1st Season’s Growth

C
Spring 2nd Season
**Know Reasons Behind Single vs. Double Trunk**

<table>
<thead>
<tr>
<th>Single Trunk</th>
<th>Double Trunk</th>
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<tbody>
<tr>
<td>- more vigorous vine</td>
<td>- Insurance from winter-kill</td>
</tr>
<tr>
<td>- more even ripening</td>
<td>- Insurance from crown gall</td>
</tr>
<tr>
<td>- easier to prune</td>
<td>- More management time</td>
</tr>
<tr>
<td>- Less management time</td>
<td></td>
</tr>
</tbody>
</table>
Know Balanced Pruning Concept

- **Lbs. Canes** :: **# Buds kept**
- 1 :: 30
- 2 \((30 + 10)\) :: 40
- 3 \((30 + 10 + 10)\) :: 50
- 4 \((30 + 10 + 10 + 10)\) :: 60*

*Max of 60

https://www.youtube.com/watch?v=uYLREQLn-Ic
Know Long (AKA Double) Pruning

1. Leave 50%+ more buds than needed
2. Final pruning after buds begin swelling
3. Terminal buds break 2-5 days earlier than count buds you want to retain.

70-80 buds per vine vs. 40 – 60 buds per vine

Long vs. Short Pruned Marechal Foch, 3-22-13 9:35 min. video:
http://www.youtube.com/watch?v=fUzbi7d8TpA
Know Optimum Vine Characteristics

2. Crop load ratio (yield wt. / pruning wt.) of 5-10 for vinifera and 8-12 for hybrids.
3. Labruscana internode lengths of 4-6” and hybrid internode lengths of 3 – 4”.
4. Minimal lateral shoot growth through the season.
5. Untrimmed shoot lengths of 4 to 6 ft.
6. Maximum of 1.5 to 2.5 leaf layers in the canopy.
7. A minimum of 12 to 15 nodes per shoot.
Know Optimum Vine Characteristics

8. Canopy gaps of 40 – 50%.
9. 50-75% of the clusters exposed to the sun.
10. Single trunks for cold hardy and double trunks for cold sensitive cultivars.
11. Maximum of 4-6 buds/shoots per foot of cordon.
12. 44 – 53 ratio of leaf area to fruit wt. (sq. inches / oz.).

See “Canopy Management Concepts” here:
http://www.extension.iastate.edu/wine/viticulture
Watch Youtube Videos

Watch Youtube Videos

 prune a 4 Year Old Marechal Foch Vine, 3-22-13 by Mike White. 9:35 min. https://www.youtube.com/watch?v=fUzbi7d8Tpa

WGGA Munckhof Barrel Pre-Pruner, 3-27-14 by Mike White. 4:04 min. https://www.youtube.com/watch?v=VyX_4YRnYcs

Many, many others to view on Youtube.
Know Your Tools

Vineyard Pruning Tools, 3-17-11 by Mike White. 8:52 min. 
https://www.youtube.com/watch?v=MUzWnsTN1a8

- Gloves
- 10% Bleach Solution
- Ergonomic gloves
- Flagging
- Bypass pruners
- Loppers
- Sharpener
- Eye Protection
- Sun protection
- Ties
- Tool Carrier
Wine-Grower-News #263  2-17-14

Midwest Grape & Wine Industry Institute:  http://www.extension.iastate.edu/Wine

Information in this issue includes:

2014 Iowa Wine Growers Association Annual Conference
Iowa – Winegrape Industry Economic Impact Survey
Iowa Wine Growers Association Hires a Marketing Director
27 Grape Pruning Resources / 27 Grape Pruning Videos

2014 Midwest Small Fruit & Grape Spray Guide now available
2-(20-22), Registration Still Open for the MN Cold Climate Conference
2-(26-28), Michigan Grape & Wine Conference
2-27 to 3-1, 17th NE Winery and Grape Growers Forum & Trade Show

3-(16-18) Beginning Grape Growers School – Wisconsin Dells, WI
3-22, World’s Largest Consumer Awards Competition – Lodi, CA
3-(23-27), Wine Executive Program – UC Davis

4-(8-10), License to Steal – National Wine Marketing Conference
4-22, Fermentation Mgt. & Microbial Control - Wisconsin

Videos of Interest  Neeto-Keeno Stuff
Show n Tell  Marketing Tidbits
Notable Quotables  Articles of Interest

Calendar of Events