Managing Bearing Vines

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The first 2.5 to 3-years are relatively simple but now

- It is time to finally recoup some investment
- In year 3 do not fully crop your vines
- Follow this

<table>
<thead>
<tr>
<th>Year</th>
<th>Crop %</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td>4</td>
<td>80</td>
</tr>
<tr>
<td>5</td>
<td>100</td>
</tr>
</tbody>
</table>

1% is based on your projected yield in year 5. As an example, 5-tons per acre in year 5, would be 3 tons in year 3 and 4 tons in year 4.
Dormant Pruning – what to leave and what should go?

- **Beginning of 3rd year**
  - Year 3
  - End of 3rd year

- **Beginning of 4th and subsequent years**
  - Year 4
  - End of 4th and subsequent years
Fruitfulness

• % buds that produce flower clusters
• Fruitfulness determined in buds during the prior year
• Inflorescences may or may not initiate in each bud
• Fruit buds can through processes other than cold damage become unfruitful

Photo credits: http://www.growingproduce.com/americanfruitgrower/?storyid=1434
“Bud”

• A “bud” occurs at each node on cane
• The “bud” composed of three “buds”
  – Primary
  – Secondary
  – Tertiary
• What is within the “bud”
“Bud”

- In each bud is a 6 to 12-node compressed shoot with primordial leaves, flower clusters, and tendrils.
Grape Anatomy

- Trunk
- Head
- Canes
- Spurs
- Renewal Spur
- Cordon Buds
- Buds
How many Nodes?

VSP: 3 to 5 SHOOTS/FT

\[
(10 \text{ SPURS} \times 2 \text{ BUDS})/2.5\text{ FT} = 8 \text{ BUDS/FT}
\]

\[
(3 \text{ SPURS} \times 2 \text{ buds/spur})/2.5\text{ FT} = 2.4 \text{ BUDS/FT}
\]

Grape and Wine Institute
University of Missouri
How many Nodes?

To many nodes
- Reduced brix in fruit
- Reduced fruit pigmentation
- Reduced shoot/cane diameter
- Increased disease pressure
- Maturation of wood poor
- Increased winter Injury

To few nodes
- Vigorous shoot growth
- Increase internode lengths
- Reduced fruit set
- Increase in fruit shading
- Increase in number of “bull canes”
- Decrease in bud fruitfullness
- Reduced cold hardiness

Size:
- 30”
How much fruit?
3 to 5 shoots ft

- **4 ft cordon**
  - 12 to 20 shoots
  - Each shoot = 2 grape clusters
  - 24 to 40 clusters
  - Each cluster 3.5 oz
  - 6.75 to 11 lbs per cordon
  - 2 cordons per plant
  - 13.5 to 22 lbs per plant

- **575 plants per acre**
  - 2.9 to 4.8 tons per acre
Economics of the Vine

- 545 vines/acre
  10’ row x 8’ plant
- 15 lbs/vine
  8,175 lbs = 4.1 ton/acre
- ~3.5 oz/cluster
  70 clusters/vine
  3.6 lbs/bottle
  4 bottles (750 ml)/vine
  2,180 bottles/acre
- $1,400/ton = $5,740/acre
- $14.00/bottle = $30,520/acre
Training Systems

• Vertical shoot positioning (VSP)
  – Bilateral cordons 32 to 36” from ground
  – Catch wires above cordons
  – Shoot growth directed upward

• High Wire
  – Bilateral cordons 66 to 72” from ground
  – Shoots combined downward
Training Methods

Low-Cordon Vertical Shoot Positioning
Training Methods

High Cordon
Use for trailing grape cultivars

Low Cordon
Use for upright grape cultivars
Pruning and Training

Initial Pruning from planting to fruiting

High Bi-Lateral Cordon
Relies on downward combing of new growth
Balanced Pruning

Vegetative growth is in proportion to fruit load to ripen the crop

- Dormant pruning is first step in balancing the vine
- Amount of pruning is based on vine vigor
Balanced Pruning

Step 1: Quantifying Vine Vigor

- Weight of one-year cane pruning's
  - Roughly prune vine leaving extra buds
  - Weigh cane pruning's
  - Apply pruning formula
<table>
<thead>
<tr>
<th>Grape Type</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>American</td>
<td>30+10</td>
</tr>
<tr>
<td>French Hybrids</td>
<td>20+10, 15 +5</td>
</tr>
<tr>
<td>New Hybrids</td>
<td>20+20</td>
</tr>
<tr>
<td>European (Vinifera)</td>
<td>20+20</td>
</tr>
</tbody>
</table>
Example Balanced Pruning

Pruning Formula: 20 +10

20 count buds for first pound of canes and an additional 10 count buds for each additional pound of canes

Cane weight = 1 lb: 20 count buds
Cane weight = 2 lb: 30 count buds
Cane weight = 3 lb: 40 count buds
Problems with Balanced Pruning

Hybrid Grape Cultivars Typically
  Multiple shoots from count buds
  Multiple clusters per shoot

Alternative
  5 to 6 shoots/ft of vine
  Calculate number of clusters needed for yield
  Cluster thin and or shoot thin

Spare parts are good to have around
Balanced Pruning

Bring your experience to the vineyard

Pruning Formulas

- Grape cultivars perform differently based on vineyard site
  - High vigor sites
  - Low vigor sites
- Each vine is an individual

After pruning a few vines using balanced pruning – you become calibrated
Pruning and Disease Management

Remove old dead wood from grapevine

- Cordon Renewal

- Trunk Renewal
  - Own rooted versus rootstock

- Liquid Lime Sulfur Application Timing
  - Bud swell
Large Pruning Cuts
Large Pruning Cuts

Avoid large pruning cuts until early summer
Large cuts and trunk diseases
  • *Botryosphaeria* spp.
  • *Eutypa lata*
  • *Pestolotiopsis*
  • *Phomopsis viticola*

Time of pruning, size of wound and wood age all play role in infection

Wound susceptibility declines at high temperatures
First: always have sharp pruning shears. Sharp shears make clean cuts that heal quickly compared to rough cuts.

Removing cane prunings from the vineyard if practical. If going to this effort take the next step and destroy the prunings.

No need to sterilize pruning shears.

Remove old cluster rachises and mummy berries.
Pruning Timing

What to prune first should be prioritized based on a grape cultivars susceptibility to winter cold injury

1. Prune American cultivars first
2. Prune cold tolerant hybrids (Vignoles, Seyval, Norton)
3. Prune cold sensitive hybrids (Vidal, Traminette, Chambourcin)
4. Prune Vinifera that are less winter cold sensitive, Cabernet Franc
5. Prune Vinifera that are more cold sensitive

Use your experience to decide as vineyard to vineyard variation will play a role
Pruning and You

Remember that you grow with your vines. Each year you learn something about your vineyard's growth and production. Apply that knowledge as you prepare to prune your vines.

Select sentinel vines in your vineyard

- Quantify dormant cane weights
- Quantify cluster weights and numbers
- Quantify crop load
Barrel Pre-Pruner
The spurs, cordons, and trunk are often referred to as permanent wood

- Spurs die
- Leaving blind wood on the cordon, blind wood does not produce fruit
- Trunks often become infected with trunk diseases
- Vine renewal should be part of your vineyard management plan
  - A new trunk should be brought up from the vine crown every 10 years
  - Removing trunk diseased grapevines more often results in maintaining the productivity of the vineyard
<table>
<thead>
<tr>
<th>Growth Stage</th>
<th>Fungicide</th>
<th>Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>½-1-inch shoots, 3-5-inch shoots, 8-10-inch shoots followed every 7-10-days until fruit set</td>
<td>Mancozeb (1.5 lb per 25 GPA early in season. Increase rate and volume as vines grow)</td>
<td><strong>Phomopsis</strong>, black rot and downy mildew</td>
</tr>
<tr>
<td>Immediate pre-bloom, bloom and 2 to 3 times more at 10-14-day intervals</td>
<td>Mancozeb plus DMI or a strobilurin Rotate fungicides</td>
<td><strong>Black rot</strong>, Phomopsis, and downy and powdery mildew</td>
</tr>
<tr>
<td>Bunch closure</td>
<td>Capta, Ziram, phos acid plus DMI or strobilurins or combos</td>
<td><strong>Downy and Powdery mildew</strong> on foliage</td>
</tr>
<tr>
<td>Post veraison</td>
<td>Pristine</td>
<td><strong>Rots</strong></td>
</tr>
<tr>
<td>Post harvest</td>
<td>Mancozeb</td>
<td><strong>Downy mildew</strong></td>
</tr>
</tbody>
</table>
Why You need to write a pesticide Disease Management Plan

- Save money
- Reduce risk of pest being selected for resistance to pesticide
- Be ready for pest outbreak
- Peace of mind
- Avoid phytotoxicity
Remember the Birds
## Basic Calendar

<table>
<thead>
<tr>
<th>Month</th>
<th>Phenology</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>Dormant</td>
<td>Dormant Pruning</td>
</tr>
<tr>
<td>February</td>
<td>Dormant</td>
<td>Dormant Pruning</td>
</tr>
<tr>
<td>March</td>
<td>Dormant</td>
<td>Dormant Pruning</td>
</tr>
<tr>
<td>April</td>
<td>Bud break</td>
<td>Disease management begins, shoot thinning</td>
</tr>
<tr>
<td>May</td>
<td>Flowering</td>
<td>Disease management, flower thinning, cluster thinning</td>
</tr>
<tr>
<td>June</td>
<td>Berry touch</td>
<td>Disease and Japanese beetle management</td>
</tr>
<tr>
<td>July</td>
<td>Berry growth</td>
<td>Disease and insect management. Bringing up new canes for trunks, removing cordons, removing unproductive vines</td>
</tr>
</tbody>
</table>
## Basic Calendar cont.

<table>
<thead>
<tr>
<th>Month</th>
<th>Phenology</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>August</td>
<td>Veraison</td>
<td>Disease management. Harvest some cultivars</td>
</tr>
<tr>
<td>September</td>
<td>Harvest</td>
<td>Disease management. Harvest some cultivars</td>
</tr>
<tr>
<td>October</td>
<td>Harvest</td>
<td>Disease management. Harvest some cultivars</td>
</tr>
<tr>
<td>November</td>
<td></td>
<td>Fermentations complete</td>
</tr>
<tr>
<td>December</td>
<td></td>
<td>Vacation?</td>
</tr>
</tbody>
</table>
Sensory and Fermentation Workshop

- Take the time and invest as much effort in learning more about the grape and wine industry
- Learn from winemakers, academics, industry professionals
- Grape production goes hand in hand with wine production
  - The vintage often determines what type of wine will be made
  - Winemakers make the type of wine based on the grape chemistry and flavor profile
Final Thoughts

- You never know if your site is correct until you plant a grapevine.
- Grape vines are like children, when young they run rampant, as they progress into their teens the troubles continue then finally as they enter adulthood they finally mellow.
- You made mistakes what can you do?
  - Grafting new cultivars
- Paperwork in the form records are your friend
- Balancing a vine
- You need an understanding of winemaking to produce good quality grapes
- I hope you don’t mind but 2-week vacations are a thing of the past
Romancing the Vine