Grape Canopy Management

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Objectives

• What is effective canopy management
• Vigor Management
• Shoot Selection and Thinning
• Shoot Positioning
• Summer Pruning and Hedging
• Selective Leaf Thinning
What is an ideal canopy?
What is an ideal canopy?

• An ideal canopy is one that produces high quality fruit in sufficient volume according to the site, variety, and growing conditions

• Components of the “Perfect” Canopy
  – Balanced Vigor
  – Good shoot density
  – Good shoot positioning
  – Good air and sun exposure
Characteristics of the Ideal (or "ideotype") canopy. From Wine Grape Production Guide NRAES-145

<table>
<thead>
<tr>
<th>Canopy Characteristics</th>
<th>Optimal Value (between veraison and harvest unless otherwise noted)</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoot density</td>
<td>3 - 5 shoots per foot of canopy</td>
<td>Higher values promote canopy shade. Lower values cause excess shoot vigor and potential low crop yields.</td>
</tr>
<tr>
<td>Shoot length</td>
<td>15-20 nodes</td>
<td>Shoots less than 15 nodes (prior to trimming) are indicative of inadequate vigor. If they are trimmed to lengths less than 15 nodes, this may be excessive hedging. Untrimmed shoots longer than 20 nodes are an indicator of excess vigor.</td>
</tr>
<tr>
<td>Lateral shoot development</td>
<td>Ideally none</td>
<td>Excess lateral shoot growth may lead to shade. Presence of some laterals may provide carbohydrates to fruit and canes if leaves are not exporters of carbohydrates.</td>
</tr>
<tr>
<td>Growing shoot tip presence</td>
<td>Ideally none</td>
<td>Ideally, shoots should have stopped growing by veraison.</td>
</tr>
<tr>
<td>Individual cane weight</td>
<td>0.06-0.10 pound per cane (during dormancy)</td>
<td>Values under 0.06 pound per cane suggest inadequate vigor. Values above 0.10 pound are indicative of “bull wood” that is low in fruitfulness and susceptible to winter injury.</td>
</tr>
<tr>
<td>Cane pruning weights</td>
<td>0.2-0.4 pound per foot of canopy (during dormancy)</td>
<td>Values below 0.2 pound per foot of canopy are indicative of low vigor. Values in excess of 0.4 pound per foot of canopy are often indicative of canopy shade.</td>
</tr>
<tr>
<td>Ratio of leaf area to fruit weight</td>
<td>3-6 square feet per pound</td>
<td>Values less than 3 can be indicative of overcropping, although this value is somewhat variety-specific.</td>
</tr>
<tr>
<td>Ratio of crop weight to pruning weight</td>
<td>5-10</td>
<td>Values less than 5 are indicative of undercropping. Values greater than 10 are often indicative of overcropping, although this is very variety-specific.</td>
</tr>
</tbody>
</table>

*Adopted from Smart and Robinson (1991).*
Canopy Management Basics

Benefits of Proper Canopy Management

- Fruit Exposure
  - Uniform Ripening
  - Decreased Disease
  - Increased Color
  - Decreased Acidity
  - Increased Volatiles

- Vine Balance
  - Vigor management
- Bud Fruitfulness
- Uniform Bud Break
- Uniform Shoot Vigor
- Ease of harvest
Canopy Management Basics

Vertical Shoot Positioning

High Cordon Training
Vertical Shoot Positioning (VSP)

- Shoots are placed evenly along cordon
- Note shoot density
- Note placement of catchwires
Scott Henry Divided Canopy System:  
• Note uniformity of shoots  
• Note shoot length and placement  
• Divided canopy increases yield and helps manage vigor  
• Added labor requirement
Canopy Management

Sunlight into Wine!
Early Season Canopy Management

• **Shoot Density**
  – Number of shoots per linear foot of canopy
  – Goal of **3 – 5 shoots per foot of cordon**
  – Large clustered varieties may need less, Small clustered varieties need more

• **Timing**
  – Bud break around April 15.
  – First selection of shoots in third-fourth week of April
  – Second cleanup round first week of May
  – Third cleanup around the second week of May
Dormant pruning-
Initial shoot density selected.
Prune back to 2 buds per spur.
OK-can we count the number of buds per linear foot hear?? Can anyone say NO MERCY!
OK-can we count the number of buds per linear foot hear?? Can anyone say NO MERCY!

20 Buds per foot
When shoots reach 4-6 inches tall, selectively pluck shoots to the desired density. After threat of frost, rub off any small shoots or swollen buds.
After shoots reach 12-18 inches, re-evaluate shoot density. Many more shoots may have been produced by un-noticed buds by this time that need removed. Vigorous sites often have this problem. Failure to remove shoots now will result in a nightmare later. Repeat the mantra---No Mercy!
Notice antlerling effect.
Making Canopy Management Work at Cape May

Slide Courtesy of: Mark L. Chien, Wine Grape Agent; Penn State Cooperative Extension
On young vines, select shoots that will provide for optimum spur placement the following year. Remove fruit clusters.
Good example of poor shoot thinning and poor density management. Note that there are 8-10 shoots per foot, instead of 3-5.
Early-Mid Season Canopy Management

• Shoot Positioning
  – Placing shoots uniformly along training system
  – Use catch wires and ties or tapes to manage placement of shoots
  – Thin any excess shoots beyond density goal

• Timing is again critical:
  – Start when shoots are 18 inches long.
  – Sandwich shoots between 1\textsuperscript{st} set of catch wires
  – Repeat process with 2\textsuperscript{nd} and 3\textsuperscript{rd} set of catch wires on weekly intervals
Mid-Season Canopy Management

• Manage sunlight exposure to fruiting zone
  – Selective leaf pulling
  – Shoot Hedging

• Manage disease pressure and air movement
  – Shoot hedging
  – Shoot thinning the hard way
  – Shoot placement the hard way
Shaded fruit …
2 weeks later maturity

Increased light and temperature helps fruit to mature
Traminette 1C-b

What not to do with a hybrid. Note the excessive growth, complete shading of fruiting zone and length of shoots. Time for a good haircut.
How sweet. Good indication of an excessive number of shoots.
Two Words: No Mercy.
Dense canopy?

Shear
Gasoline trimmer. Commercial engine with quick start electronic ignition. 30 in carbon steel blades guaranteed to cut up to 1 in thick. Sealed gas tank runs up to 6 hours on a gallon.
Leaf pull: Remove 2-3 leaves from around the fruit clusters. Goal of 50-80% fruit exposure. Be sure to retain 15 leaves per shoot.
Excessive leaf pull, later in the season can result in sunscald.
Canopy Management Basics
Viticulture and Enology R&D Update
UMD/MGGA Canopy Management Study

VSP/Low cordon

High cordon
Review

• Key Success Factors
  – Timeliness
  – Balancing vigor of the site with training system and canopy management
  – NO MERCY

• Steps in the process
  – Shoot selection and thinning-Steps 1, 2 and 3
  – Shoot placement
  – Shoot length and growth control
  – Leaf Pull and fruit exposure
Canopy Management: No Mercy

Any Questions?

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