Following the Freeze: Observations and Effects

*and other stuff too*

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OGGWMA 2009
Ongoing/Upcoming Research Projects

- Cultivar Evaluation
- Rootstock Evaluation
- Reproductive Tissue Removal Studies
- Secondary Bud Crop Study
- Evaluation of Leaf Temperature vs. Ambient Temperature Study
- Phenology Data Collection
Reproductive Tissue Removal Study
Objective

How does fruiting and timing of flower/fruit removal of vines in 1\textsuperscript{st} and 2\textsuperscript{nd} leaf affect vine growth and productivity in 3\textsuperscript{rd} leaf year and beyond?
Conventional Theory

- Removal of flowers and fruit in 1\textsuperscript{st} and 2\textsuperscript{nd} leaf promotes vegetative/reproductive balance in 3\textsuperscript{rd} leaf and beyond, as well as better winter cold hardiness.

- But, does this apply to vines growing in a high vigor environment where vine balance may be required earlier?
Location and Vines

- Victory Vineyards, Quinton, OK
- ‘Cabernet Sauvignon’ clone 337
- Rootstock: 3309 Couderc
- Planted in April, 2005
- All flowers/fruit removed in 1st leaf year
Methods

- RCBD with 5 blocks, 4 treatments, 3 reps
- Trt 1 = Removal of flowers before bloom
- Trt 2 = Removal of cluster in early fruit development
- Trt 3 = Removal of cluster at veraison
- Trt 4 = No removal of fruit (harvest)
- Data collected: Harvest yield, vine caliper, pruning weights
- All vines balance pruned
Easter Freeze 2007

✦ Freeze event in the April 7-8, 2007
✦ Budbreak much earlier than normal
✦ March was 8 °F above normal statewide, 2nd warmest on record
Vines with Gall and No Gall

- **Trt 1**
  - Dead: 4
  - Gall: 4
  - No gall: 7

- **Trt 2**
  - Dead: 4
  - Gall: 4
  - No gall: 7

- **Trt 3**
  - Dead: 4
  - Gall: 4
  - No gall: 7

- **Trt 4**
  - Dead: 4
  - Gall: 4
  - No gall: 7
Treatment 1 (flower removal)

Avg. # of 2007 mummies

<table>
<thead>
<tr>
<th></th>
<th>No Gall</th>
<th>Gall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gall</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>No Gall</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

The bar graph shows the average number of 2007 mummies for treatments with and without gall.
Treatment 2 (early cluster removal)

<table>
<thead>
<tr>
<th>Gall Type</th>
<th>Avg. # of 2007 Mummies</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Gall</td>
<td>7</td>
</tr>
<tr>
<td>Gall</td>
<td>8</td>
</tr>
</tbody>
</table>
Treatment 3 (removal at veraison)

Avg. # of 2007 mummies

No Gall: 8
Gall: 12
Treatment 4 (harvest)

![Bar graph showing the average number of 2007 mummies with and without gall.](image-url)
Pooled Treatments

Avg. # of 2007 mummies

No Gall  | Gall
-------|------
       | b    |
       | a    |
Conclusions

- Pre-bloom flower removal of 2nd leaf crop may reduce crown gall expression and vine death in 3rd leaf following a freeze event.

- Vines with fewer clusters following the freeze event had less manifestation of crown gall symptoms; therefore, removal or reduction of crop load may be warranted.
Experiment Redux

- Original experiment to be done at different location (Silver Top Ranch, Ponca City)
- ‘Cynthiana’ (own root)
- ‘Vignoles’ (3309C)
Freeze Damage Recovery

- Easter 2007, significant freeze event
- Almost all cultivars affected at Perkins Research Station
- Most cultivars on both 1103P and own roots
- How have they recovered (or not)?
Production vs Budbreak 2007
Annual Production (all cvs and rs)

Yield per acre (lbs)

<table>
<thead>
<tr>
<th>Year</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield</td>
<td>8000</td>
<td>3000</td>
<td>5000</td>
</tr>
</tbody>
</table>
2006-2008 Yield Data

Yield/acre (lbs)

2006 2007 2008

Cab Franc  Cab Sauv  Chamb  Chard  Cy nth  Malbec  Merlot  P Verdot  P Gris  Ruby Cab  Sangio  Shiraz  Viognier
1103P vs Own Roots

Yield/acre (lbs)

- 1103P
- Own

<table>
<thead>
<tr>
<th>Year</th>
<th>1103P</th>
<th>Own</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>10000</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>4000</td>
<td>3000</td>
</tr>
<tr>
<td>2008</td>
<td>1103P</td>
<td>Own</td>
</tr>
</tbody>
</table>
2006 Rootstock Data

Yield/acre (lbs)

- Cab Franc
- Cab Sauv
- Chamb
- Chard
- Cynthia
- Malbec
- Merlot
- P Verdot
- P Gris
- Ruby Cab
- Sangio
- Shiraz
- Viognier

Legend:
- **1103P**
- **Own**
2007 Rootstock Data

Yield/acre (lbs)

- Cab Franc
- Cab Sauv
- Chamb
- Chard
- Cyth
- Malbec
- Merlot
- P Verdot
- P Gris
- Ruby Cab
- Sangio
- Shiraz
- Viognier

[Bar chart showing yield per acre for different rootstocks, comparing '1103P' and 'Own']
2008 Rootstock Data

Yield/acre (lbs)

- Cab Franc
- Cab Sauv
- Chamb
- Chard
- Cynth
- Malbec
- Merlot
- P Verdot
- P Gris
- Ruby Cab
- Sangio
- Shiraz
- Viognier

1103P
Own
# Vine Mortality

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Alive</th>
<th>Dead</th>
<th>Alive</th>
<th>Dead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabernet Franc</td>
<td>6</td>
<td>0</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Cab Sauvignon</td>
<td>10</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Chambourcin</td>
<td>.</td>
<td>.</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Chardonnay</td>
<td>9</td>
<td>0</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Cynthiana</td>
<td>10</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Malbec</td>
<td>10</td>
<td>0</td>
<td>6*</td>
<td>4</td>
</tr>
<tr>
<td>Merlot</td>
<td>10</td>
<td>0</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Petit Verdot</td>
<td>9</td>
<td>0</td>
<td>6*</td>
<td>3</td>
</tr>
<tr>
<td>Pinot Gris</td>
<td>8</td>
<td>0</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Ruby Cabernet</td>
<td>10</td>
<td>0</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Sangiovese</td>
<td>10</td>
<td>0</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Shiraz</td>
<td>9</td>
<td>0</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Viognier</td>
<td>10</td>
<td>0</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>111</strong></td>
<td><strong>0</strong></td>
<td><strong>89</strong></td>
<td><strong>35</strong></td>
</tr>
</tbody>
</table>
Conclusions

✦ Many vines still in recovery phase
✦ Cynthiana unaffected, Chambourcin only slightly affected
✦ Budbreak date doesn’t tell whole story
✦ Rootstocks more productive, less mortality (0% vs. 28%)
✦ This year will determine level of recovery
Phenology Data Collection

- Network of Growers to collect data
- Phenology data very important to understand how grapes grow and react in our environment
- Frontier Country Grape Growers has expressed interest
- Collected data can help growers in cultivar selection
- Workshop to outline vine stages and data collection TBA
Extension Projects

- Pocket Guide to Diseases, Insects, and Other Disorders
- Viticulture Handbook
- Newsletter
- www.grapes.okstate.edu
- Grape Management Short Course
- Workshops
Other Things of Interest

- Wine Forum of Oklahoma
- National Viticulture and Enology Extension Leadership Conference
- Wines and Vines