Effects of rootstock selection on finished wine from mature high-grade Pinot Noir clone 114 vines

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Overview

• Introduction
  o The Australian Wine Industry and Phylloxera
  o Current understanding of rootstocks

• Project methodology
  o Grape selection
  o Fermentation procedures
  o Analysis and evaluation
Phylloxera & Australia

- Grape phylloxera (*Daktulosphaira vitifoliae*)
  - Destroys *Vitis vinifera* vines by feeding on roots

- Found in Geelong in 1877 (PGIBSA, 2003)

- Current PIZ’s (Vinehealth Australia, 2016)
  - Victoria
    - North East, Maroondah, Nagambie, Mooroolbark, Upton and Whitebridge
  - New South Wales
    - Sydney region and Albury
Rootstocks

• American native vines developed evolutionary resistance to phylloxera
• Grafting of common, desirable grape varietals on to tolerant rootstocks is only current strategy for phylloxera tolerance
• Main rootstock parentages (Whiting, 2003)
  o *Vitis riparia* x *Vitis rupestris*
    • Low drought tolerance, low to moderate vigour, associated with quality wine production
  o *Vitis berlandieri* x *Vitis riparia*
    • Moderate drought tolerance, good grafting affinity
  o *Vitis berlandieri* x *Vitis rupestris*
    • Vigorous, good drought tolerance, long vegetative cycle
Rootstock Selection

- Rootstock selection depends on many factors (Goldammer, 2013)
  - Climate
  - Soil type
  - Preferred vineyard management style
  - Grape varietals to be grafted
Schwarzmann

- *Vitis riparia x Vitis rupestris* (Goldammer, 2013)

- Not ideal in drought conditions

- Improves fruit set
  - Consistently higher berry count

- Poor sugar to acid relationship under water stress

- Higher juice pH
### Schwarzmann Process Data

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>INCOMING WEIGHT</td>
<td>355kg</td>
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<tr>
<td>DESTEM WEIGHT</td>
<td>321.5kg</td>
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<td>START BAUME</td>
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<tr>
<td>START pH/TA</td>
<td>3.55/8.28g/L</td>
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<tr>
<td>START MALIC ACID</td>
<td>1.89g/L</td>
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</table>
Schwarzmann Faults
140 Ruggeri

- *Vitis berlandieri x Vitis rupesris* (Goldammer, 2013)
  - Moderately vigorous
  - Long vegetative cycle, delayed ripening
  - High phylloxera resistance
  - Moderately drought tolerant
<p>| | |</p>
<table>
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<td><strong>DESTEM WEIGHT</strong></td>
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<td><strong>START pH/TA</strong></td>
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<td><strong>START MALIC ACID</strong></td>
<td>2.81g/L</td>
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140 Ruggeri Faults
1103 Paulsen

• *Vitis berlandieri x Vitis rupesris* (Goldammer, 2013)

• Vigorous

• Extremely long vegetative cycle

• Prefers drought conditions
## 1103 Paulsen Process Data

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<td>START MALIC ACID</td>
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1103 Paulsen Faults
Bunch Architecture
Schwarzmann
140 Ruggeri
1103 Paulsen
Intent of Research

• Is there a detectable difference between rootstocks
  o Physical
  o Chemical
  o Sensory

• Does this have an effect on perceived quality?
  o Benchmark testing
Materials and Methods

• Grape selection
  o Considered an established premium site for Pinot Noir
    • Upper Yarra Valley
    • East facing slope
    • 330m elevation
    • Entire vineyard planted on rootstock in 2001
  
  o Block 8 – Pinot Noir clone 114 on three rootstock variants
    • 140 Ruggeri
    • 1103 Paulsen
    • Schwarzmann
Materials and Methods

• Harvest
  - Four pre-selected rows hand-picked simultaneously into individual half-tonne solid bins

• Processing
  - 12 hour cold stabilisation at 13 degrees
  - Destemmed into individual solid bins
  - Standard addition of PMS and pectolytic enzyme
  - 48 hour cold soak at 15 degrees
  - Given ferment codes
    • 17PIN18
    • 17PIN19
    • 17PIN20
Materials and Methods

• Primary Fermentation
  o Warmed to 21 degrees
  o Innoculated with Laffort Zymaflore X-Pure yeast strain
  o Daily hand plunge
  o Four day extended maceration post-Bé dry
  o Pressed off skins with basket press

• Transfer to barrel
  o 5 year old barriques
  o Each filled to 190L
  o Topped to 225L with 17PIN01
    • Neutral own-rooted Pinot Noir clone 114
Materials and Methods

• Secondary Fermentation
  o Currently undergoing malolactic fermentation in barrel
  o Sulphur addition will be made at completion

• Post-Fermentation
  o Will be left in barrel for a 6 month maturation period
  o Each barrel will be bottled independently
Physical Observations

• Vineyard observations
  o Response to water
  o Vine health during season
  o Relative canopy vigour

• Fruit observations
  o Degree of shrivel
  o Indications of fruit set
  o Bunch architecture
  o Bunch weight (average, 20 bunches)
  o Berry count (average, 20 bunches)
  o Berry weight (average, 100 berry from 20 bunches)
Chemical Analysis

- **Berry analysis**
  - Potassium of pulp and skins
  - YAN
  - Bé, pH, TA

- **Ferment analysis**
  - Daily Bé and temperature during primary
  - Bé, pH and TA at completion of primary
  - Malic acid

- **Finishing analysis**
  - pH, TA and VA
  - Residual sugar
  - Alcohol
# Finishing Analysis

<table>
<thead>
<tr>
<th>Schwarzmann</th>
<th>140 Ruggeri</th>
<th>1103 Paulsen</th>
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</thead>
<tbody>
<tr>
<td>3.53</td>
<td>3.60</td>
<td>3.59</td>
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<tr>
<td>6.93g/L</td>
<td>6.42g/L</td>
<td>6.94g/L</td>
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Sensory Analysis & Benchmarking

• Preference tasting of grapes and active ferments
  o Ranked in order from 1 = most preferred to 3 = least preferred

• Full sensory analysis to be conducted on bottled wine
  o Triangular tasting
  o Single, double and triple blind tasting
  o Descriptive tasting

• Benchmarking
  o Presented to conference for tasting against other wines of high or premium perceived quality
SENSORY ANALYSIS

• Preference among producers when blind and double blind tasting has consistently been for the wines made from 140 Ruggeri or 1103 Paulsen
  o Attitudes towards Schwarzmann wine were negative, with comments of “over-ripe” and “stewed”

• Preference among retail staff and consumers when blind and double blind tasting has been Schwarzmann with a preference of 75%
  o Comments of “earthy”, “rich” and “fruity” for this wine, comments of “too acidic” and “not very fruity” for other two wines
References

- PGIBSA (2003), A guide to grape phylloxera in Australia. Phylloxera and Grape Industry Board of South Australia, Australia.
- Whiting, J. (2003), Selection of grapevine rootstocks and clones. DPI, Australia.