Rootstock effects on yield, maturity and the incidence of bunch stem necrosis in Cabernet Sauvignon

Tim Pitt1, Phil Nicholas2, Richard Cirami2, Mike McCarthy1 and Paul Petrie1,3

1 SA Research and Development Institute (SARDI) GPO Box 397 Adelaide SA 5001 tim.pitt@sa.gov.au
2 Formerly of SARDI 3 Australian Wine Research Institute

Revisiting a 33 year old rootstock trial demonstrates the long-term performance of grafted versus own rooted vines

Information about the performance of rootstocks beyond their first 10 years is scarce. In the 2015 and 2016 vintages, SARDI revisited a suite of its 22+ year old rootstock trials to determine the longevity of various rootstock/scion combinations. One of the oldest trials revisited was Cabernet Sauvignon (LC14) located in Langhorne Creek, South Australia. The trial was planted in 1983 on a fine sandy clay loam over clay that had previously grown vines. It consisted of seven replicates of five rootstocks, including own roots.

Yield reduced with age but response to rootstock remained stable over time

Yield components were assessed in the first, second and fourth decades of the vineyards life. At 32-33 years of age, own rooted vines produced 26% lower yield than vines grafted to Schwarzmann and almost 50% that of vines grafted to 110-Richter, Teleki-5C and Ramsey. This maintained the trend from the early years of the trial, Figure 1.

Reduced incidence of bunch stem necrosis on vines grafted to Ramsey

During the 2015 vintage, Cabernet Sauvignon vines in Langhorne Creek were subjected to elevated levels of bunch stem necrosis (BSN). Yield assessment protocols were modified to account for shrivelled bunches and investigate the influence of rootstock on the incidence and severity of BSN. BSN affected 38% of bunches on own rooted of vines as compared to 12.5% of bunches on vines grafted to Ramsey, Table 1.

<table>
<thead>
<tr>
<th>Rootstock</th>
<th>Total bunch count (n/vine)</th>
<th>BSN incidence (%)</th>
<th>Deliverable fruit (kg/vine)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own roots</td>
<td>88.0 a</td>
<td>38.1 a</td>
<td>2.8 a</td>
</tr>
<tr>
<td>Schwarzmann</td>
<td>98.1 ab</td>
<td>37.4 a</td>
<td>3.8 ab</td>
</tr>
<tr>
<td>SC Teleki</td>
<td>107.4 abc</td>
<td>35.6 a</td>
<td>5.0 b</td>
</tr>
<tr>
<td>110 Richter</td>
<td>122.9 c</td>
<td>25.1 ab</td>
<td>7.3 c</td>
</tr>
<tr>
<td>Ramsey</td>
<td>109.4 bc</td>
<td>12.5 b</td>
<td>7.4 c</td>
</tr>
</tbody>
</table>

LSD (P=0.05) 20.2 17.6 1.9

Different superscript within columns indicates significant difference between means

Berries harvested from vines grafted to Ramsey were less mature with lower tannin content than those grown on own roots or grafted to other rootstocks. Colour density was also lower, Fig 2.

Rootstock effect on juice qualities

Whilst high vigour vines, such as those grown on Ramsey, are reported to be more susceptible to BSN than low vigour vines, this was not the case at this trial. Assessments were repeated in 2016 but the incidence of BSN was much lower than the previous vintage and too low for the rootstock effect to differentiate.

Acknowledgements

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Figure 3. Langhorne Creek Cabernet Sauvignon bunches (2015). Healthy (L) and affected by BSN (R)