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# Rootstock Selection and Management

Rootstock Group	Parents Species	Rootstocks	General Attributes
1	<i>V. champinii</i>	Ramsey	<ul style="list-style-type: none"> <li>•high vigour</li> <li>• excellent drought, salt and nematode tolerance</li> <li>•performs best at sites with low fertility soils and limited water availability.</li> </ul>
2	<i>V. berlandieri</i> x <i>V. rupestris</i>	<ul style="list-style-type: none"> <li>•140 Ruggeri</li> <li>•1103 Paulsen</li> <li>•110 Richter</li> <li>• 99 Richter</li> </ul>	<ul style="list-style-type: none"> <li>•moderate-high vigour</li> <li>•drought tolerant</li> <li>•moderate to high tolerance of lime, nematodes and saline soils</li> <li>•best suited to warm-hot regions.</li> </ul>
3	<i>V. berlandieri</i> x <i>V. riparia</i>	<ul style="list-style-type: none"> <li>•5C Teleki</li> <li>• 5BB Kober</li> <li>•420A</li> <li>•SO4</li> </ul>	<ul style="list-style-type: none"> <li>•moderate-high vigour</li> <li>•moderately sensitive to dry conditions, may hasten ripening and fruit set.</li> <li>•best-suited to cooler climates.</li> </ul>
4	<i>V. riparia</i> x <i>V. rupestris</i>	<ul style="list-style-type: none"> <li>•101-14</li> <li>• 3309C</li> <li>•Schwarzmann</li> </ul>	<ul style="list-style-type: none"> <li>•low-moderate vigour</li> <li>•do not perform well in dry conditions</li> <li>•particularly suited to cool climate regions.</li> </ul>


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## Review of Resources and Rootstock Selection Methods

- Regional rootstock trials
- Using Grapevine Rootstocks: The Australian Perspective (May, 1994)
- Rootstock Characteristics Table (Nicholas, 1997)
- The Yalumba Nursery 'Rootstock Selector'
- Rootstock and Clones for Greater Victoria (Whiting, 2003)
- Rootstocks (Whiting, 2004) . In: Viticulture Volume 1: Resources
- Grapevine Rootstocks: Selection and Management for South Australian Vineyards (Dry, 2007)
- Regional experience from commercial vineyards

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# The Yalumba Nursery 'Rootstock Selector'

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[Rootstock Selector](#) [Rootstock Profiler](#) [Characteristic Glossary](#) [Ratings References](#)

### Rootstock

The Rootstock Selector allows you to easily identify suitable rootstock varieties for your location.

- To use, specify the known criteria of your site (under the pop menus) and then press the 'Find Matches' button. You will be presented with a list of potential rootstocks to suit your location.
- Click on the rootstock name or 'View Details' link to access an in-depth profile for each rootstock.
- The 'Rating References' provides the details of the literature that has cited the specific ratings for the rootstock's characteristics. Additionally, you can browse all the rootstocks in the database by clicking the 'Rootstock Profiler' tab.

The 'Characteristics Glossary' tab provides an explanation of the rootstock's characteristics.

You can download the full table of [Rootstock Characteristics and Ratings](#) in excel format and a PDF version of the [Rating References](#) for offline viewing and printing purposes.

<b>Location</b>	Region: Cool Climate
<b>Variety</b>	Colour: Red Fruit Set: Good
<b>Water</b>	Irrigation: Not Required (Sufficient natural supply) Availability: Abundant Quality: Unknown
<b>Growth Requirement</b>	End Use: Premium Vigour: Medium
<b>Soil</b>	pH: Unknown Drainage: Waterlogging (in Growing season) Salinity: Low 2-4 dS/m
<b>Pests</b>	Nematodes: Low population

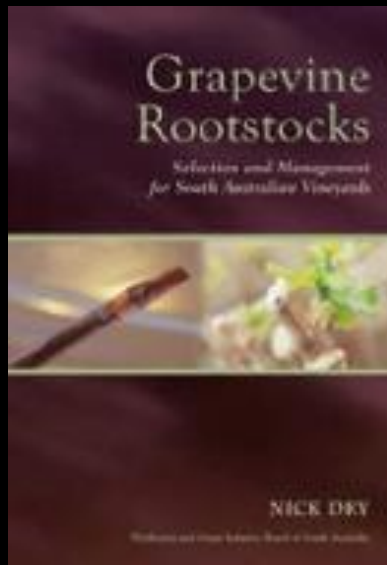
**Find Matches**

© Yalumba Nursery. Information provided is based on international and national literature as well as local experience. Expert advice may be required for your specific site.

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## Selection of Rootstocks and Clones for Greater Victoria (Whiting, 2003)

## Grapevine Rootstocks: Selection and Management for South Australian Vineyards (Dry 2007)



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## Impact of rootstock on vine performance: zero irrigation Spring 2007-February 12<sup>th</sup> 2008



101-14



1103 Paulsen

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## Impact of rootstock on vine performance: zero irrigation Spring 2007-February 12<sup>th</sup>



Schwarzmann



140 Ruggeri

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## Rootstock use (%) in Yalumba Vineyards compared with regional rootstock use.

Region	% of Yalumba vineyards planted to rootstock	Estimate of total region
Barossa Valley	7%	20%*
Coonawarra	45%	2%*
Eden Valley	50%	13%*
King Valley (Victoria)	100%	Close to 100%
Oxford Landing Estate (Riverland)	99.9%	40%*
Wrattonbully	69%	8%

\*2007 PAGIBA vineyard register data from (Dry, N. 2007)

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## Oxford Landing Estate (OLE)

### Considerations for rootstock selection:

High water requirements (Aridity)

Low Potential soils

Nematodes (in particular RKN)

MJT°C	23.2
GSRF (mm)	113
Aridity (mm)	569
Main Soil Type	Deep and gradational sands

- Ramsey used exclusively since 2004, based on observations and numerous trials.
- On higher potential soils of the Riverland, consider using group 2 rootstocks
- Under no circumstance would group 3 and 4 rootstocks be recommended (due to high Aridity)

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## Eden Valley Vineyards

### Considerations for rootstock selection:

Reliance on surface run-off for irrigation

Skeletal soils

Predominately white varieties

MJT°C	19.3
GSRF (mm)	183
Aridity (mm)	384
Main soil types	Shallow sand-sandy loams Sand-sandy loams over clay

- While Eden Valley is considered a rel. cool climate (based on MJT), because of factors listed, group 2 rootstocks recommended.
- On higher potential sites group 3 and 4 could be considered, but only if there is consistent access to irrigation water **EVEN DURING DROUGHT**

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## Heggies Vineyard Dam (Eden Valley) 2008-2009



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## Wrattonbully Vineyards

### Considerations for rootstock selection:

Consistent water availability

Site Potential

End-product objectives

MJT°C	20.2
GSRF (mm)	188
Aridity (mm)	338
Main soil types	Shallow-moderate depth clay loam over limestone Deep loamy sand over clay

- With good access to water, group 3 and 4 rootstocks can be considered
- The most consistent performing rootstocks are the moderate vigour rootstocks of group 2 (110 Richter, 99 Richter) and group 3 (5C Teleki)
- Group 2 rootstocks on low potential sites, Group 4 rootstocks on high potential sites.



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## Coonawarra Vineyards

### Considerations for rootstock selection:

Cool, dry climate

Quality

MJT°C	19.5
GSRF (mm)	182
Aridity (mm)	347
Main soil types	Shallow-moderate depth red clay loam over limestone Black cracking clays over limestone

A rootstock trial comparing 3 rootstocks (1103 Paulsen, 5C Teleki and 101-14) was established in 2006. Observations from the last two seasons :

- 1103 Paulsen performs well during 'normal' to dry seasons. In 2011 it produced noticeably more vigorous vines, higher yield and less intense fruit.
- 101-14 performed very well in the wet conditions experienced in 2011, but has struggled in the drier years.
- 5C Teleki has been a consistent performer over the course of the trial.



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## King Valley Vineyards

### Considerations for rootstock selection:

Low Aridity

High Potential Site

MJT°C	20.1
GSRF (mm)	341
Aridity (mm)	74
Main soil type	Deep red and brown gradational soils

- Older plantings of 5BB Kober and S04 are consistently good, but vigour control can be difficult even in 'dry' seasons
- Newer plantings on 101-14 and achieving 'vine balance' has required lower management inputs.
- Other rootstocks that perform well: Schwarzmann (higher potential sites) and 99 Richter (lower potential sites)

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## Redbank Vineyard (King Valley) January 2010



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## Regional Commercial Experience- Yalumba Wines Summary

- Water availability to the vine (via rainfall and or irrigation) is the most important consideration.
- If water availability is limited or shortages are expected in the future, then selection of a suitable drought tolerant rootstock is first priority.
- Where water availability is assured there is greater scope for using lower vigour rootstocks and selection may be more generally based on soil type and other site factors (apart from water availability).



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## Aridity (mm)

### Growing Season Rainfall (GSRF)

- estimated crop-water use  
(measured by class A pan evaporation x 0.5 crop factor)  
(Dry et al., 2004)

- Aridity is an indication of vine water requirements supplementary to rainfall.
- The higher the Aridity value, the greater amount of irrigation required at a site.

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# Using Aridity (mm) to help predict rootstock suitability


Region	MJT°C*	GSRF** (mm)	Aridity (mm)	Rootstock groups
Riverland	23.2	113	569	1 and 2
Adelaide Plains	22.4	155	490	1 and 2
Barossa Valley	21.2	163	474	1 and 2
Padthaway	20.3	159	439	2
Eden Valley	19.3	183	384	2 and 3
Langhorne Creek	20.5	164	372	2 and 3
Coonawarra	19.5	182	347	2,3 and 4
Rutherglen	23.3	262	340	2 and 3
Wrattonbully	20.2	188	338	2, 3 and 4
McLaren Vale	21.4	182	323	2, 3 and 4
Goulbourn Valley	21.1	250	200	2 and 3

Region	MJT°C*	GSRF** (mm)	Aridity (mm)	Rootstock groups
Adelaide Hills (Lenswood)	19.1	276	192	3 and 4
Launceston	17.7	290	135	3 and 4
Adelaide Hills (Stirling)	18.7	329	121	3 and 4
Beechworth	20.4	375	100	3 and 4
Alpine Valleys	21.3	363	77	3 and 4
Mornington Peninsula	19	323	62	3 and 4
Yarra Valley	19.2	375	60	2, 3 and 4



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## A novel method for using Aridity (mm) to predict rootstock suitability

- Regions categorised by Aridity ranges.
- The Aridity range for each category was determined by rootstock group suitability from the table of 18 viticultural regions
- For each Aridity category, general and specific recommendations for the rootstock groups that should be considered for the category based on experience with rootstocks in 18 viticultural regions

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## Prediction of rootstock suitability for regions with **Aridity >500mm**

Region	MJT°C	GSRF (mm)	Aridity (mm)	Rootstock Group Suitability
Swan District	24.5	123	630	
<b>Riverland</b>	<b>23.2</b>	<b>113</b>	<b>569</b>	<b>1 and 2</b>
Murray Darling	23.6	133	546	

- Crop-water use is high and rainfall is low.
- To ensure minimum risk and minimum inputs (water and nutrient) use drought tolerant rootstock (group 1 and 2) without exception.



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# Prediction of rootstock suitability for regions with Aridity 350-499mm

Region	MJT°C	GSRF (mm)	Aridity (mm)	Rootstock Group Suitability
Swan Hill	23.4	153	497	
<b>Adelaide Plains</b>	<b>22.4</b>	<b>155</b>	<b>490</b>	<b>1 and 2</b>
Riverina	23.9	192	481	
<b>Barossa Valley</b>	<b>21.2</b>	<b>163</b>	<b>474</b>	<b>1 and 2</b>
<b>Padthaway</b>	<b>20.3</b>	<b>159</b>	<b>439</b>	<b>2 and 3*</b>
Clare Valley	21.5	199	426	
<b>Eden Valley</b>	<b>19.3</b>	<b>183</b>	<b>384</b>	<b>2 and 3*</b>
<b>Langhorne Creek</b>	<b>20.5</b>	<b>164</b>	<b>372</b>	<b>2 and 3*</b>
Great Southern (Frankland River)	20.5	165	368	

\*group 3 rootstocks only recommended at sites with moderate-high site potential and good access to water

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## Prediction of rootstock suitability for regions with **Aridity 350-499mm**

- Rainfall is generally limited and vineyards in these regions are heavily reliant on irrigation
- Therefore drought tolerant rootstocks (group 1 and 2) should be the starting point for selection.
- There are only a few exceptions where lower vigour rootstocks could be considered, e.g. on high potential soils, with access to water.

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# Prediction of rootstock suitability for selected regions with **Aridity 200-349mm**

Region	MJT°C	GSRF (mm)	Aridity (mm)	Rootstock Group Suitability
<b>Coonawarra</b>	<b>19.5</b>	<b>182</b>	<b>347</b>	<b>2,3 and 4*</b>
<b>Rutherglen</b>	<b>23.3</b>	<b>262</b>	<b>340</b>	<b>2 and 3</b>
<b>Wrattonbully</b>	<b>20.2</b>	<b>188</b>	<b>338</b>	<b>2, 3 and 4*</b>
<b>McLaren Vale</b>	<b>21.4</b>	<b>182</b>	<b>323</b>	<b>2,3 and 4*</b>
Heathcote	21	236	310	
Grampians	19.1	251	304	
Margaret River	20.4	198	257	
Mudgee	23.3	365	235	
Hilltops	22.6	304	221	
<b>Goulburn Valley</b>	<b>21.1</b>	<b>250</b>	<b>200</b>	<b>2 and 3</b>

\*group 4 rootstocks only recommended at sites with moderate-high site potential and good access to water



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## Prediction of rootstock suitability for regions with **Aridity 200-349mm**

Use group 2 and 3 rootstocks with the following factors taken into consideration:

- Length of growing season (and rootstock influence on ripening)
- Site potential
- Water availability



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# Prediction of rootstock suitability for selected regions with **Aridity 50-199mm**

Region	MJT°C	GSRF (mm)	Aridity (mm)	Rootstock Group
Cowra	23.5	317	198	
<b>Adelaide Hills (Lenswood)</b>	<b>19.1</b>	<b>276</b>	<b>192</b>	<b>3 and 4</b>
<b>Launceston</b>	<b>17.7</b>	<b>290</b>	<b>135</b>	<b>3 and 4</b>
Canberra District	20.3	364	122	
<b>Beechworth</b>	<b>20.4</b>	<b>375</b>	<b>100</b>	<b>2*,3 and 4</b>
Strathbogie Ranges	19.2	358	93	
<b>Alpine Valleys</b>	<b>21.3</b>	<b>363</b>	<b>77</b>	<b>3 and 4</b>
<b>King Valley (Myrree Ridge)</b>	<b>20.1</b>	<b>341</b>	<b>74</b>	<b>3 and 4</b>
Orange	19.6	468	62	
<b>Mornington Peninsula</b>	<b>19</b>	<b>323</b>	<b>62</b>	<b>3 and 4</b>
<b>Yarra Valley</b>	<b>19.2</b>	<b>375</b>	<b>60</b>	<b>2*,3 and 4</b>

\*group 2 rootstocks only recommended at sites with low-moderate site potential and good access to water



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## Prediction of rootstock suitability for selected regions with **Aridity 50-199mm**

- If the vineyard has good access to water, then it would be beneficial to use a group 3 or 4 rootstock
- Where water availability is severely limited (reliance on surface run-off) then a lower vigour group 2 rootstock (110 Richter or 99 Richter) should be considered.

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## Prediction of rootstock suitability for regions with Aridity <50 mm

Region	MJT°C	GSRF (mm)	Aridity (mm)	Rootstock Group
Hobart	16.7	308	47	
Tumbarumba	20.1	425	25	
Hunter	23.7	436	22	
Granite Belt	21.5	488	0	



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## Prediction of rootstock suitability for regions with **Aridity <50 mm**


- High rainfall and low evaporation indicates that group 4 rootstocks perform best.
- There are some circumstances where group 3 rootstocks could be considered (shallow low fertility soil, sites in a rain shadow).



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## Aridity- Summary

- Aridity is a very useful indicator to match a rootstock to the climatic conditions in a region where there has been limited past use of rootstocks.
- The major weakness of the method is that it has used long-term climatic averages but shorter term observations.



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## Final Thoughts...

The best method for matching a rootstock to manage a soil type and environment is one that takes into consideration the following factors:

- Water requirements based on environmental conditions i.e Aridity
- Irrigation system capacity i.e. the ability to deliver water to the vine
- Site potential (soil depth and fertility)