

Results of the 2004-2007 rootstock performance data collection series

McLaren Vale

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Introduction

McLaren Vale, located in the Fleurieu Peninsula of South Australia, is a premium wine grape growing region with the predominant varieties of Cabernet sauvignon and Shiraz.

McLaren Vale is characterised by a climate that is moderate, with winter dominant rainfall and moderate temperatures during the growing season. Some of the region is on quite sandy soil types and nematodes are a key issue for some growers at these sites.

Water stress is another key issue for grapegrowers. Most vineyards require irrigation. The use of recycled water accounts for about 15% of the irrigated area in McLaren Vale whilst the remaining 70% of vineyards are irrigated from underground sources which vary in their salinity levels and in their availability (Dry et al. 2004)

In 2004, phylloxera resistant rootstocks accounted for less than 8% of the 7,388 hectares of total vineyard area planted in McLaren Vale. However, since 2002, 20% of the new plantings have been on rootstock, with Chardonnay, followed by Shiraz and Cabernet Sauvignon being the most commonly grafted varieties. Rootstocks are historically used for protecting vines against phylloxera and nematodes but more recently they have been proven as solutions to issues associated with increasing salinity levels and restricted water supply.

The main considerations for rootstock selection in McLaren Vale currently include:

- Drought tolerance / water use efficiency
- Salinity tolerance
- Nematode resistance

Rootstock data collection 2004 - 2008

McLaren Vale had five sites surveyed on the following soil types:

- Deep bleached sands
- Loam over coarsely structured clay
- Black clay over loam duplex
- Ironstone rich loam over red clay
- Silty loam over red clay

The rootstocks assessed in McLaren Vale were:

- 5BB Kober
- 140 Ruggeri
- 1103 Paulsen
- 101-14
- Schwarzmann

Table 1. *Summary of site management practices for the vineyards involved in data collection*

Site / Rootstock	Soil	Fertility	Nutrition	Irrigation	Pruning/canopy
M1/ 5BBK	SAND	MOD-HIGH	NPK	DRY GROWN	HAND PRUNED/ SPRAWL
M2 / 140RU	SAND	LOW	MINIMAL	SHORT FREQUENT	SPUR / VSP
M3/ 1103P	LOAM	MOD-LOW	NIL	POST VERASION	MACHINE / VSP
M4/101-14	BLACK CLAY	HIGH	NIL	DEFECIT	MACHINE/ DOUBLE CORDON
M5/ 1103P	LOAM-SAND	MOD-LOW	ZINC MANG	AS VINE REQUIRES	MACHINE / TWO WIRE
M6 / SCHW	SILTY LOAM	MOD-HIGH	MAP ZINC MANG	HANGTIME	MACHINE / TWO WIRE

Variables assessed were:

- Pruning weights
- 50 berry weights
- Yield
- Colour
- Quality (grade achieved)

Results and discussion

Table 2. *Results of data collection yield and quality data*

Site	Rootstock	Pruning weight (kg/m)	Yield (t/ha)	Colour	Quality ¹
M1	5BB Kober	1.53	13.6	2.0	3.5
M2	140 Ruggeri	0.3	6.8	1.9	1
M3	1103 Paulsen	0.96	9.8	1.9	3
M4	101-14	1.15	12.9	1.8	3
M5	1103 Paulsen	0.7	7.9	1.8	2
M6	Schwarzmann	1.21	8.9	1.8	3

5BB Kober (site M1)

The deep bleached sand block exhibited high yield and vigour with high vine capacity. 5BB Kober displayed high yield and vigour under these soil conditions. Management styles in adding supplementary fertiliser may be compounding the vigour issue although it is more a soil / rootstock interaction as minimal water is given to these vines as a whole.

At this site 5BB Kober was “acting pessimistically”; that is, was taking up all available water initially, resulting in excessive vigour early in the season, followed by no available water and early senescence in the later part of the season.

In summary, the data indicates that 5BB Kober was not well-suited to this vineyard, soil type or climate. The block produced high yields and high vigour resulting in an unbalanced canopy. The quality assessment (3.5 – ie commercial grade) confirms this assessment.

140 Ruggeri (site M2)

The deep bleached sand block averaged super premium quality across the three years on 140 Ruggeri rootstock.

2007 growing conditions were dry; 140 Ruggeri was able to maintain yield with consistent super premium quality on lower irrigation inputs.

140 Ruggeri exhibited low vigour (pruning weights 0.30 kg/m) and Nitrogen levels were low in the vine, which would be contributing to the low vigour.

140 Ruggeri is a rootstock with moderate to high vigour potential; managing this rootstock to achieve super premium quality has been achieved through a lack of N inputs and irrigation, allowing for a vine of controlled, balanced vigour.

140 Ruggeri is well suited to this site, provided that management and water inputs are **minimised**.

¹ 1 = super premium, 2 = premium, 3 = semi-premium, 4 = commercial

101-14 (site M4)

The black clay over loam block averaged a semi-premium wine quality. The block exhibited moderate to high vigour with high yields resulting. Site vigour for this block was high and this has affected the growth of the rootstock, making it vigorous. Pruning weights for vines were high (1.15kg/m).

101-14 is characterised as a low vigour rootstock. The high vigour of this block is attributed to the soil fertility and water availability of the site. 101-14 has devigourated this site when compared to own roots (for example own roots yielded 9.63t/ha while 101-14 yielded 8.03t/ha).

Management techniques, such as planting a cover crop that will increase competition for nutrients / water, could be used to devigourate the vineyard.

This rootstock has good potential for this site, provided water and fertility are managed accordingly.

1103 Paulsen (sites M3 and M5)

M3

M3 produced semi-premium quality throughout the three years of data. The main issue with this block was vineyard variability.

There were sections that were wetter and deeper that produced excessive vigour and sections on shallower, lower potential areas that produced inadequate vigour. There were sections of the block that were in balance, but the degree of variability made it difficult for the winery to assess any higher than semi-premium.

This block highlights the important influence that management has on vine/rootstock performance. The use of the covercrop is an important consideration when using moderate to high vigour rootstocks and has been used to advantage in this block.

It is recommended that growers on soils with moderate-high RAW's that choose to use moderate to high-vigour rootstocks should use deep rooted, high water use cover-crops, to minimise the potential for high vigour during the early or wetter part of the season. If rainfall is not forthcoming these cover-crops can be easily taken out of the equation through chemical mowing.

M3 is a large block and given the soil and topographic variation it probably should not have been all planted to 1103 Paulsen. Balance was achieved in the shallower, lower potential sections, and yet in the higher potential sections where there was excessive available moisture, excessive vigour prevailed.

A recommendation for this block would be to plant with rootstocks according to the potential of the site, so in this instance a low vigour rootstock (e.g Schwarzmann, 101-14, 420A) would have been the preferred option whilst on the shallower soil 1103 Paulsen, as stated, was a good option.

M5

M5 has consistently produced excellent quality at moderate yields. Yield and quality were maintained in 2007, indicating that the dry conditions did not appear to affect vine performance, as would be expected with 1103 Paulsen, a characteristically drought-tolerant rootstock.

Matching this moderate-high vigour rootstock with the low potential soil has resulted in the production of moderate vigour and balanced vines and excellent quality. Managing with minimal nitrogen inputs has also had an important influence.

This block is an example of a well-matched rootstock and soil type and appropriate management resulting in the production of well balanced vines and excellent quality.

Schwarzmann (site M6)

The silty clay loam over red mottled clay block exhibited moderate-high vigour, moderate-high yield and moderate-high capacity. The block averaged semi-premium quality across the three years.

Schwarzmann is a low vigour rootstock and the high vigour associated with the vines is a result of the soil type and irrigation management. Management techniques including planting a cover crop that will increase competition for nutrients / water as well as applying less irrigation throughout the season could be used as a strategy to devigourate the vineyard.

Conclusion

The data collected from these sites over three years has shown that in McLaren Vale rootstocks were able to produce a wide range of quality depending on the target end product and management of vineyards.

The data collection has highlighted the fact that management plays a key role in the success and quality of the rootstock.

High vigour rootstocks such as 1103 Paulsen and 140 Ruggeri are generally best suited to sites of moderate-low fertility, where inputs such as fertiliser and water are able to be kept to a minimum.

On the other hand, 101-14 and Schwarzmann - both low vigour rootstocks - would be good options for the higher vigour sites or where waterlogging and deeper soils are an issue.

In addition, some sites will require more than one rootstock due to naturally occurring vineyard variability, whereby a combination of high and low vigour rootstocks would help even out vineyard variability and **create vine balance**.

The Board's recommendations for the choice of rootstocks in McLaren Vale are:

- 1103 Paulsen
- 140 Ruggeri
- 110 Richter
- 101-14

The data collection project has been intended to help select suitable rootstocks for McLaren Vale. Data collection has specifically taken into account site factors and end use requirements of each property involved in the project. The data collected and recommendations are intended to be used as general guidelines and are not to be considered as personal, professional advice. Growers should seek individual advice before acting on these guidelines.