

CSIRO Grapevine Rootstocks

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Australian Government
Grape and Wine Research and
Development Corporation

*Phylloxera tolerance testing
done with input from DPI,
Rutherglen, Victoria*

Three rootstocks from the CSIRO grapevine rootstock breeding program are available and have been granted Plant Breeders Rights (PBR). The rootstocks are Merbein 5489, Merbein 5512 and Merbein 6262. Here, we summarise the key characteristics of each of the rootstocks and present a comparison of harvest data, pruning weight and wine data compared to Ramsey and 1103 Paulsen, all with Shiraz in Sunraysia over 3 seasons (mean values for the period 2001-2003).

Merbein 5489

Merbein 5489 is a medium vigour rootstock. Pruning-wood weights from Shiraz grafted to Merbein 5489 were about half of those grafted to Ramsey and 1103 Paulsen in a Sunraysia trial. Despite having medium vigour, the Shiraz vines on Merbein 5489 produced similar yields per vine to those grafted to 1103 Paulsen rootstock.

In screening trials, Merbein 5489 was tolerant of the G1, G4 and G30 strains of phylloxera.

Shiraz vines grafted to Merbein 5489 established in a re-plant soil infested with nematodes showed no ill effects over a period of 18 years. Vines of Merbein 5489 were resistant to one biotype of *Meloidogyne javanica* in a pot-trial conducted under glasshouse conditions. They were also tolerant of *Meloidogyne incognita* and a second biotype of *M. javanica* in that whereas galls and egg masses were spread throughout Sultana vine roots, they were either absent or observed at a low frequency in root systems of Merbein 5489.

Based on levels accumulated in leaf petioles at harvest under irrigation with Murray water in Sunraysia, Merbein 5489 had an ability equivalent to 1103 Paulsen for sodium and chloride exclusion.

Shiraz vines grafted on Merbein 5489 had a higher crop water use index (CWUI) than those grafted on 1103 Paulsen in a Sunraysia-based trial. Higher CWUI (crop produced per unit of water used) is an indicator of water use efficiency.

Shiraz on Merbein 5489 (Sunraysia trial) accumulated significantly less potassium in berries leading to a lower juice and wine pH and thus less need for acid adjustments in winemaking.

Wine made using fruit from Shiraz vines grafted to Merbein 5489 in the warm Sunraysia region had higher colour density, lower colour hue (brighter wine), higher total phenolics and higher ionized anthocyanins (the coloured form of anthocyanins) than equivalent wines made using fruit of Shiraz on 1103 Paulsen and Ramsey rootstocks.

Merbein 5512

Merbein 5512 is a low vigour rootstock. Pruning-wood weights from Shiraz vines grafted to Merbein 5512 were about one-third of those grafted to Ramsey and 1103 Paulsen in a Sunraysia-based trial. The Shiraz vines on Merbein 5512, with their reduced vigour, produced yields per vine which were 25 and 47% lower than those grafted to 1103 Paulsen and Ramsey rootstocks, respectively.

In screening trials, Merbein 5512 was tolerant of the G4 and G30 strains of phylloxera.

Shiraz vines grafted to Merbein 5512 established in a re-plant soil infested with nematodes showed no ill effects over a period of 18 years. In comparison with own-rooted Sultana vines, Merbein 5512 was tolerant of *Meloidogyne javanica* and *Meloidogyne incognita* in a pot trial conducted under glasshouse conditions. Whereas galls and egg masses were spread throughout Sultana roots, they were either absent or observed at a very low frequency in root systems of Merbein 5512.

Based on levels accumulated in leaf petioles at harvest under irrigation with Murray water in Sunraysia, Merbein 5512 had an ability equivalent to Ramsey and 1103 Paulsen for chloride and sodium exclusion, respectively.

Shiraz on Merbein 5512 (Sunraysia trial) accumulated significantly less potassium in berries leading to lower juice and wine pH and thus less need for acid adjustments in winemaking.

Wine made using fruit from Shiraz vines grafted to Merbein 5512 in the warm Sunraysia region had higher ionized anthocyanins (the coloured form of anthocyanins) and lower colour hue (brighter wine) than equivalent wines made using fruit of Shiraz on 1103 Paulsen and Ramsey rootstocks. Wine from Shiraz on Merbein 5512 also had higher colour density and higher total phenolics than that from Shiraz grafted on Ramsey.

Merbein 6262

Merbein 6262 is a low vigour rootstock. Pruning-wood weights from Shiraz grafted to Merbein 6262 were about one-third of those grafted to Ramsey and 1103 Paulsen in a Sunraysia trial. The Shiraz vines on Merbein 6262, with their reduced vigour, produced yields per vine which were 16 and 41% lower than those grafted to 1103 Paulsen and Ramsey rootstocks, respectively.

In screening trials, Merbein 6262 showed moderate tolerance towards the G4 and G30 strains of phylloxera. Moderate tolerance indicates a risk of phylloxera developing on the roots but at relatively low levels compared to *Vitis vinifera*.

Shiraz vines grafted to Merbein 6262 established in a re-plant soil infested with nematodes showed no ill effects over a period of 18 years. Vines of Merbein 6262 were resistant to two biotypes of *Meloidogyne javanica* in a pot trial conducted under glasshouse conditions. They were also tolerant of *Meloidogyne incognita* in that whereas galls and egg masses were spread throughout Sultana vine roots, they were either absent or observed at a low frequency in root systems of Merbein 6262.

Based on levels accumulated in leaf petioles at harvest under irrigation with Murray water in Sunraysia, Merbein 6262 had an ability equivalent to 1103 Paulsen and Ramsey for sodium exclusion. However, mean chloride concentrations (% dry weight) in petioles of Shiraz vines were 0.95% grafted on Merbein 6262 compared with 0.34% on Ramsey.

Shiraz on Merbein 6262 (Sunraysia trial) accumulated significantly less potassium in berries leading to lower juice and wine pH and thus less need for acid adjustments in winemaking.

Wine made using fruit from Shiraz vines grafted to Merbein 6262 in the warm Sunraysia region had higher colour density, lower colour hue (brighter wine), higher total phenolics and higher ionized anthocyanins (the coloured form of anthocyanins) than equivalent wines made using fruit of Shiraz on 1103 Paulsen and Ramsey rootstocks.

Comparison of harvest data, pruning and wine data

Shiraz/ rootstock	Vigour	Harvest			Wine				
	Pruning Wt (kg)	Juice °Brix	Juice pH	Yield (kg)	Acid Added (g/L)	Wine Ph	Colour Density (au)	Colour Hue	Total Phenolics (au)
1103 Paulsen	4.2 _c	25.6 _d	4.18 _d	11.8 _b	4.72 _d	3.57 _b	6.26 _{ab}	0.61 _b	53.8 _b
Ramsey	4.3 _c	25.2 _c	4.25 _e	16.7 _c	5.95 _e	3.58 _b	5.84 _a	0.59 _b	49.5 _a
Merbein 5489	2.0 _b	24.3 _b	3.83 _a	13.3 _b	1.90 _a	3.49 _a	7.56 _c	0.54 _a	60.9 _c
Merbein 5512	1.5 _{ab}	24.5 _b	3.91 _b	8.8 _a	2.72 _b	3.48 _a	6.55 _b	0.55 _a	56.8 _b
Merbein 6262	1.2 _a	23.7 _a	3.94 _b	9.9 _a	2.60 _{ab}	3.51 _a	8.17 _d	0.53 _a	62.4 _c

Values with different subscripts are significantly different ($p=0.05$)

Suitability of the rootstocks in various locations and regions with various scion varieties and their tolerance of different pests and diseases and strains thereof is yet to be fully tested. Given that the rootstocks with Shiraz as scion vary in vigour and yield to pruning weight ratio, different management strategies will need to be considered in order to obtain best performance in specific situations.

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