Influences of Rootstock on the Performance of MV6 Pinot Noir - Berry and Wine Composition

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Abstract: Rootstocks are commonly used in many Australian vineyards and could contribute to the improvement of grape production and quality through managing disease and abiotic stresses. This project compared 14 different rootstocks on the berry and wine composition of Pinot Noir scion grown in Mornington Peninsula. Different rootstocks showed clear differences in berry and wine pH, total free phenolic content, condensed tannin content, wine volatile profile, wine phenolic profile and sensory attributes. The present study provides guidance in selecting rootstock for MV6 Pinot Noir in cool climate wine region.

Aims: This project aims to investigate the impacts of 14 different rootstocks on scion performance and grape/wine quality using *Vitis vinifera* L. cv Pinot Noir MV6 as model plant.

This report is part of a multi-year research project, where the first stage was to evaluate the influences of rootstock on the physiological performance of MV6 Pinot Noir during 2019, 2020 and 2021 vintages, while the second stage focuses on the influence on grape and wine quality during 2020 and 2021 vintages. This poster illustrates the key results of the second stage of study.

Materials and Methods: This study was conducted at Robinson vineyard located in the Mornington Peninsula wine region of Victoria, Australia (S38.295, E145.058, Elevation 48 m).

Scions of *V. vinifera* L. cv Pinot Noir were grafted onto 14 rootstocks in 2014 and 2016 with 3 replicates per treatment and one panel per replicate. The studied rootstocks were: 101-14, 1103 Paulsen, SO4, 110 Richter, Schwarzmann, 5C Teleki, 3309C, Merbein 5489, Merbein 6262, Merbein 5512, C20, C29, C113 and C114. Grapevines were also planted on own root as control. The vineyard was managed according to industrial practices with no severe pest or disease occurrences during the experimental vintages. 1.5 kilograms of grape were sampled from each replicate at commercial harvest and subjected to small-scale winemaking. Another 15-20 kilograms of grape were collected from each treatment for winemaking at commercial winery. Chemical analyses were performed for grape and lab wine, including brix, pH, titratable acidity, total free phenolic content, condensed tannin content, wine volatiles and wine phenolics were measured. Sensory evaluation by professional panels was conducted using wine made at commercial winery.

Berry composition

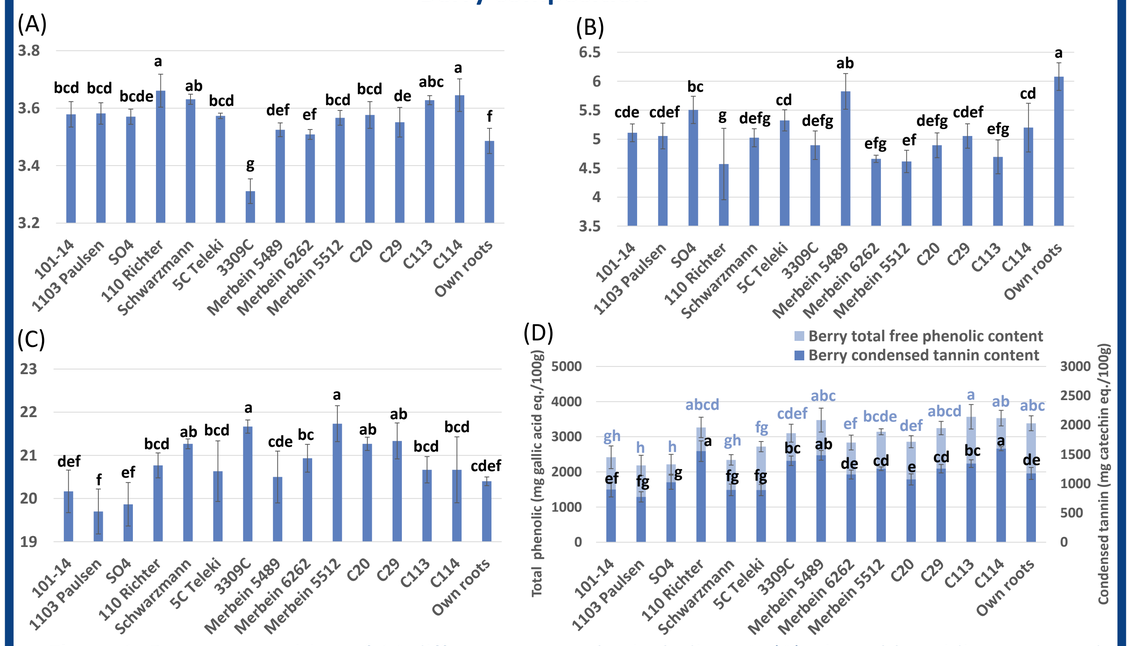

Figure 1. Berry composition of 14 different rootstocks, including pH (A), titratable acidity expressed as g/mL H_2T (B), Total soluble sugar content expressed as Brix (C), Total free phenolic content expressed as mg gallic acid eq./100g and condensed tannin content expressed as mg catechin eq./100g in berry (D).

Findings:

- Slightly increased pH and decreased TA were observed in all rootstocks compared to own roots, except 3309C;
- Higher soluble sugar content was observed in berries of 3309C and Merbein 5512;
- 101-14, 1103 Paulsen, SO4, Schwarzmann, 5C Teleki, Merbein 6262 and C20 had clearly lower total free phenolics in grapes than others;
- Grapes from 110 Richter and C114 had the highest condensed tannin content.

Wine composition

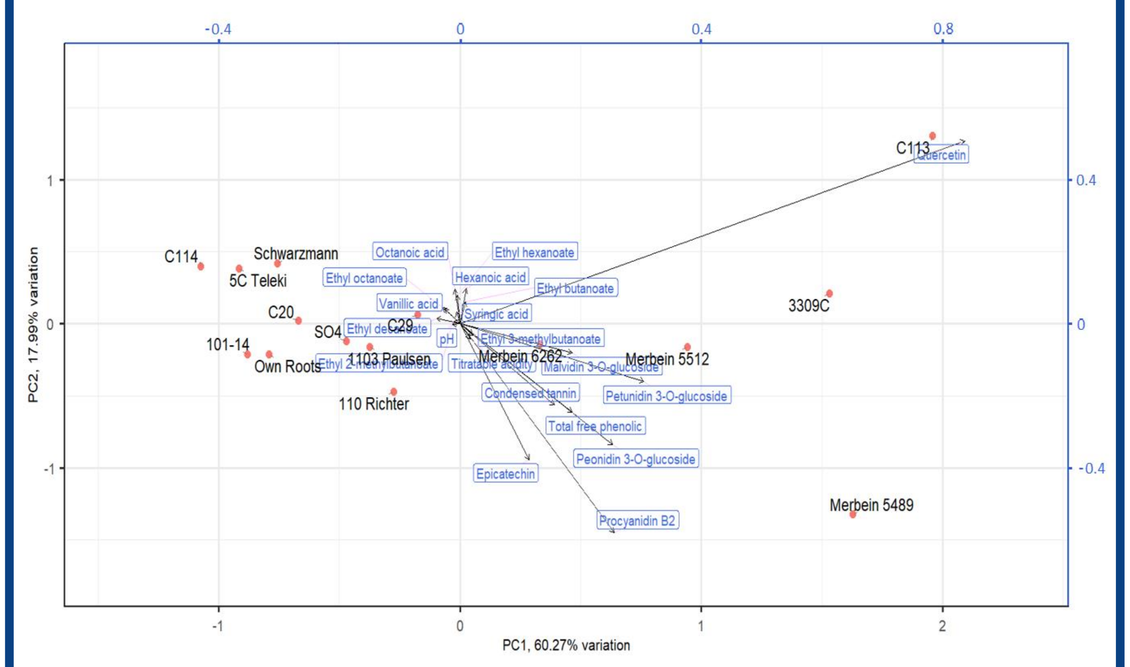

Figure 2. Principal component analysis (PCA) biplot of wine composition among studied rootstocks in 2020-21 vintage.

Findings:

- Pinot Noir grafted to Merbein series, 3309C, and C113 were significantly different from Pinot Noir on own root and grafted to other rootstocks, predominately due to higher concentrations of anthocyanidins, quercetin and procyanidin B2;
- The variations in odour active volatiles among rootstocks less significant compared to the variations in phenolic composition.

Sensory evaluation by professional panel

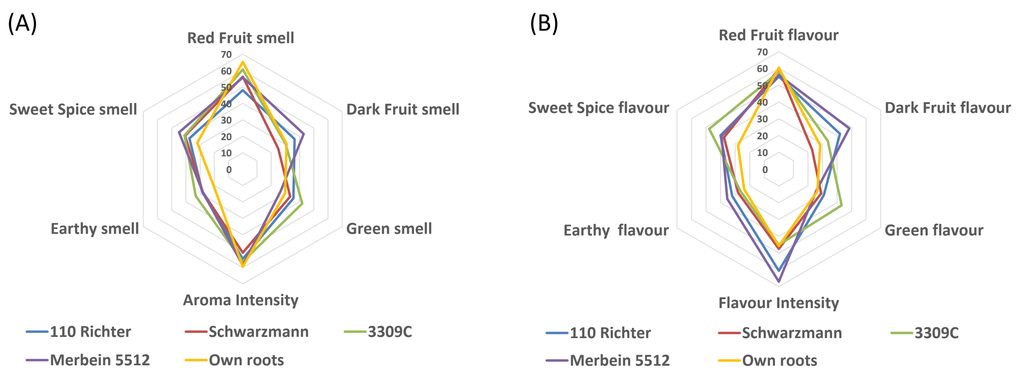

Figure 3. Sensory evaluation results of selected wines: aroma profile (A) and flavour profile (B).

Findings:

- Selected rootstocks leaded to higher wine spice aroma/flavour but less red fruit aroma/flavour;
- Significant increase in dark fruit aroma/flavour was observed in Merbein 5512 and 110 Richter compared to own roots, while Schwarzmann reduced dark fruit aroma/flavour;
- 3309C leaded to increased earthy aroma and green aroma/flavour.

Conclusion and Recommendations:

- 3309C leads to reduced berry pH, but does not increase titratable acidity;
- 1103 Paulsen and SO4 lead to lower Brix;
- 101-14, 1103 Paulsen, SO4, Schwarzmann, Teleki, Merbein 6262 and C20 may reduce total free phenolics content of Pinot Noir grape;
- 110 Richter and C114 may lead to higher condense tannin content;
- Wine from Merbein series, 3309C, and C113 are clearly different from others in volatile and phenolics composition, mainly due to the differences in anthocyanins, reflect differences in colour;
- 110 Richter and Merbein 5512 can enhance dark fruit, earthy, and sweet spice compared to own root, while 3309C may lead to increase in green character.

This poster illustrates analytical and sensory results reflecting the impacts of rootstock on berry/wine quality. The result could benefit the Australian wine industry by providing guidance in selecting rootstocks for Pinot noir scion.

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