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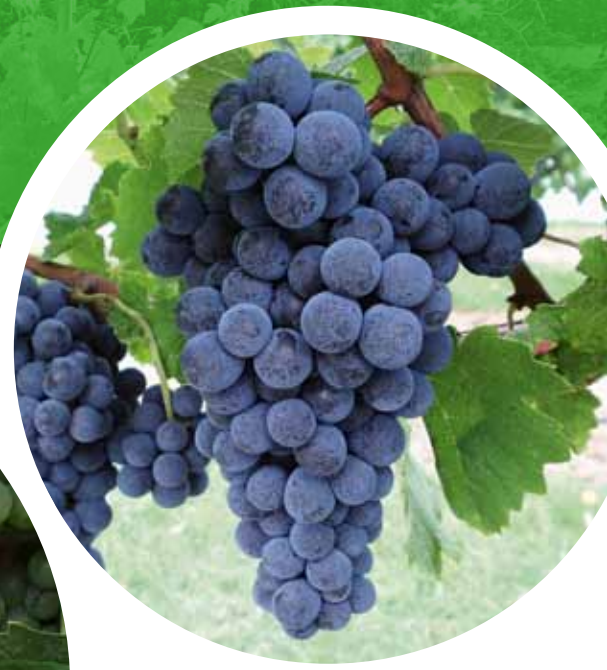

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Table of Contents

Background

Since 1998 the Department of Agriculture and Food, Western Australia (DAFWA) in conjunction with the Western Australian Vine Improvement Association (WAVIA) have imported over 60 new varieties and clones of wine grape material into Western Australia. These new varieties and clones were identified by the wine industry as having both domestic and international wine market potential to enhance the production and development of premium WA wine. The grapevine material is currently located in the Foundation Collection at the Manjimup Horticultural Research Institute (MHRI). In 2003 a trial of 18 of these varieties was established in order to gain an understanding of their grape production, winemaking characteristics and suitability to production in Manjimup, Western Australia.

The alternative varieties include both red and white varieties of grapes that originate from France, Spain, Italy, Russia, Germany and Hungary. Varieties evaluated include Arneis, Scheurebe, Vermentino, Tannat, Harslevelu, Kadarka, Brachetto, Gamay, Fer, Viognier, Tempranillo, Savagnin Blanc, Lagrein, Barbera, Saperavi, Furmint, Pinot Gris and Durif. The trial establishes a readily available source block of vine material for industry and measures vine growth and development, fruit yield, fruit composition, wine quality and wine sensory analysis.

Grapevine propagation material

Grapevine propagating material of all alternative varieties listed in this publication is available through application to the Western Australian Vine Improvement Association. Information is available on the DAFWA website at www.agric.wa.gov.au (search 'WAVIA').

Grape production environment

The alternative wine grape variety trial site at the MHRI is established on gravel loam soil. The 4-year (2007 to 2010) average rainfall for the site is 901.5 mm. The mean January temperature at MHRI (2007 to 2010 average) was 20°C. The vines received supplementary irrigation based on evaporation rates. All vines (26 vines per variety) were established on their own roots on a VSP trellis with a planting distance of 2 m by 3 m. Nutrition was applied annually (in spring) based on petiole analysis at flowering. Vines were managed by the spray application of chemicals, where required, for control of powdery mildew, downy mildew, Botrytis and garden weevil. Herbicide applications for weed control were conducted in spring with subsequent inter-row mulching of weeds during the season. All vines were covered with netting after the onset of veraison to protect the grapes from bird damage. All fruit harvesting and pruning operations were conducted by hand.

Wine production

The winemaking approach in this evaluation has focused on producing wines that allow maximum varietal expression and to understand the varieties' potential for premium wine production. The first year of wine production from this trial occurred in 2007 and since then, wine has only been made from those varieties that have produced sound, mature fruit.

Wines produced from the first two vintages (2007 and 2008) were made using the standard winemaking process (as illustrated in Figure 1 and 2) in order to gain a preliminary understanding of the potential of the varieties and the best-suited wine styles. From 2009 onwards, commercial winemaking techniques were employed to optimise varietal expression in the final wines. Such commercial techniques included:

- Skin contact / cold soak: for further extraction of compounds from the skins,
- Yeast selection: optimal selection to bring out the varietals' wine sensory characteristics,
- Juice run-off: to concentrate must and increase the skin-to-juice ratio,
- Fermentation temperature: lower temperature for whites to retain volatile aromatics and higher temperature for reds to aid extraction,
- Oak chips / dust: to contribute palate structure, aroma and flavour,
- Timing of grape harvest: examined to determine optimal fruit chemical and sensory parameters suited to the desired style for the variety.

Research was conducted to examine the influence of commercial winemaking techniques on perceived quality for selected varieties. As such, two separate wines were made for selected varieties. One wine was made as a 'control' utilising the standard winemaking process (Figures 1 and 2) whilst the second wine was made using 'commercial' techniques to produce a wine of a determined style. These wines were assessed by a panel of 16 winemakers, who revealed an 85 per cent higher preference for the commercial treatments. These results have validated the importance of matching varieties to wine style when evaluating the potential of alternative wine grape varieties.

Figure 1. Standard white winemaking process

Harvest
- Hand pick.
- Store fruit at <5˚C overnight.

Crush/de-stem

Press *(free run and pressing fractions combined)*
- Add 30 mg/L SO_2 & 5 mg/L pectolytic enzyme.
- Adjust acid if necessary.

Settle

Rack
- Warm juice to 16˚C.

Inoculate
- Add 250 mg/L active dry yeast strain (EC1118).
- Add 200 mg/L DAP.

Ferment
- Maintain temperature at 16˚C.
- Add 60 mg/L SO_2 once dry.

Heat stabilise
- Bentonite added at predetermined rate from heat stability trial.

Rack
- Remove clears from yeast/bentonite lees.
- Adjust acid if necessary.

Cold stabilise
- Hold at 2˚C for 6 weeks.
- Adjust SO_2 to bottling specification.

Bottle (0.45 µm membrane filter)

Wine Assessment

Wines produced from this evaluation have undergone a number of sensory assessments. These assessments have been conducted by experienced wine judges, winemakers and wine consumers. In 2009 a panel of 16 winemakers assessed wines from the 2008 and 2009 vintage using the Australian Wine Show Scoring System. In addition to this event, wines have been evaluated at various wine shows including the RSM Bird Cameron Timber Towns Regional Wine Show, Australian Alternative Varieties Wine Show (AAVWS) and the Qantas Wine Show of Western Australia. All wines were judged in experimental classes, excluding the AAVWS where the wines were judged in commercial classes. Varieties that performed well in these events were Barbera, which received a high commendation (equivalent to a gold medal) at the AAVWS, and Saperavi, which received a silver medal score from the winemaker panel.

In order to understand consumer perceptions of the alternative variety wines, a consumer survey was performed in 2010. Forty educated wine consumers were asked to score the wine's colour, aroma, flavour, body, wine style and commercial potential on a 9-point likeability scale. The top performing variety from this assessment was Saperavi, with all categories liked by more than 85 per cent of respondents. Other varieties that also scored highly included Lagrein, Barbera and Scheurebe (late pick).

Figure 2. Standard red winemaking process

Harvest
- Hand pick.
- Store fruit at <5˚C overnight.

Crush/de-stem
- Add 25 mg/L SO_2.
- Adjust acid if required.
- Warm to 16˚C.

Inoculate
- Add 250 mg/L active dry yeast strain (EC1118).
- Add 200 mg/L DAP.

Ferment
- Hand plunge twice daily.
- Temperature maintained at 16˚C.

Press *(free run and pressing fractions combined)*
- Press at 0.0˚Be.

Rack
- Off gross lees.

Malo-lactic fermentation
- Inoculate with *Oenococcus oeni*, maintained at 21˚C.

Rack
- Once malic acid <0.1 g/L add 50 mg/L SO_2.

Cold Stabilise
- Hold at 2˚C for 6 weeks.
- Adjust SO_2 to bottling specification.

Bottle (3.00µm membrane filter)

Alternative variety performance

Specific information on the performance of each alternative wine grape variety has been provided in the following pages. This information includes:

Timing of key phenology stages at Manjimup

The timing of key phenology growth stages is provided as an average of four growing seasons from 2007 to 2011. Growth stages are indicated by the modified Eichhorn–Lorenz (E-L) system and include budburst (E-L 4), full bloom (E-L 23), veraison (E-L 35) and harvest (E-L 38). The detail of phenology stages has endeavored to encompass the timing for both early and late seasons.

Production information and characteristics

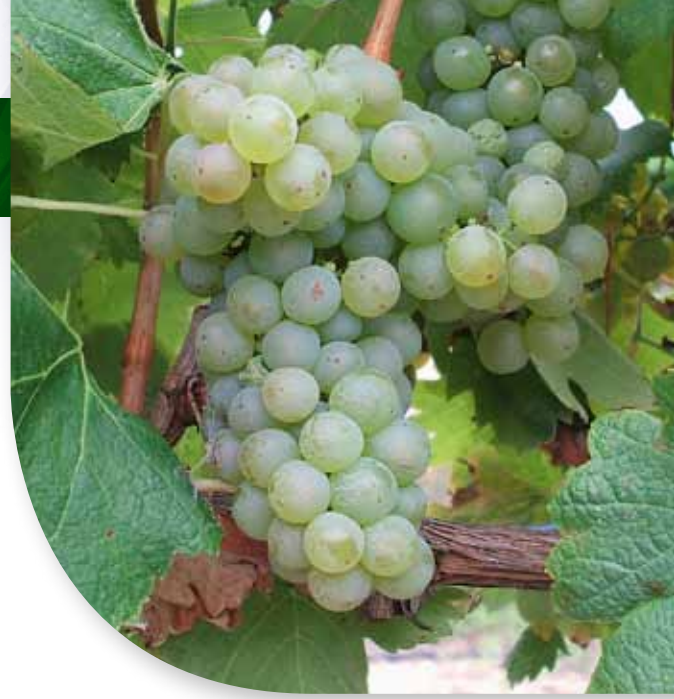
Background information and characteristics of the production of each variety at Manjimup includes:

Wine sensory assessment

Information from the wine sensory assessment is detailed for each variety. This assessment includes a consumer wine survey and assessment by wine judges at wine shows. The wine consumer assessment was conducted by 40 educated wine consumers who were asked to score the wine's colour, aroma, flavour, body, wine style and commercial potential on a 9-point likeability scale. Survey results are noted in each variety page within this booklet, expressed in terms of the percentage of respondents who either 'liked', 'neither liked or disliked', or 'disliked' the wine for each category. The wine judging results include the scoring of wines as evaluated by the Winemakers Panels, the RSM Bird Cameron Timber Towns Wine Show, the Australian Alternative Variety Wine Show and the Qantas Wine Show. The scoring of wines is by the Australian Wine Show Scoring System out of a total score of 20 points that includes appearance (max. 3 points), nose (max. 7 points) and palate (max. 10 points).

Productivity	Based on number of bunches per vine and expressed as low, medium and high.
Bunch weight	Average bunch weight < 100 g = low; 100 to 200 g = medium; > 200 g = high.
Berry weight	Average berry weight < 1 g = low; 1 to 2 g = medium; > 2 g = high.
Fruit yield / vine	Actual yield per vine, averaged over trial period. For the majority of varieties, bunch thinning was conducted at veraison.
Equivalent yield / ha	Fruit yield per vine expressed as the equivalent yield per hectare.
Disease susceptibility	Incidence of powdery mildew, downy mildew and bunch rots expressed as low, medium or high.
Bunch compaction	Visual assessment of how compressed the berries are within the bunch, expressed as low, medium or high.
Vigour	Assessment of fruit yield in relation to pruning weight, expressed as low, medium or high.
Juice TSS (°Brix)	Average total soluble solid content of grape juice at harvest expressed as °Brix.
Juice Baume	Average baume content of grape juice at harvest.
Juice pH	Average pH content of grape juice at harvest.
Juice TA g/L	Average titratable acidity (TA) expressed as g/L.

Arneis Clone: CVT CN 15



Production of Arneis dates back to the 15th century in the Piedmont region in north-western Italy. The variety is pronounced 'ar-naze' and literally means 'little rascal' which refers to the variety's production of low yields. Arneis is an emerging variety in the Australian industry, with commercial plantings established in the eastern states. Wine styles vary from light-bodied, dry and faintly grassy to a fuller style with distinctive peach with light oak. Harvested above 12.5°Be, wines become rich and viscous.

Timing of key phenology stages at Manjimup

Budburst (E-L 4)	Full bloom (E-L 23)	Veraison (E-L 35)	Harvest (E-L 38)
Mid-September	Mid-late November	Late February	Late March

Production information

Arneis rootlings established well in the field and produced the first crop for wine production in 3.5 years. This variety was spur-pruned, leaving canopies that required minimal shoot thinning early in the season. Literature suggests that Arneis has low basal bud fertility, however this was not the case in plantings at Manjimup. Arneis produced at least one bunch per shoot, with many secondary bunches removed at veraison to allow adequate ripening. Approaching harvest, Arneis fruit is sensitive to sunburn, requiring canopy management to ensure adequate leaf coverage. Arneis produces fruit with good acid content, rockmelon and juicy fruit flavours with grassy skins. Wines show lifted musk, floral and lime aromas, fine mineral, lime, peach and melon flavours.

Wine sensory assessment

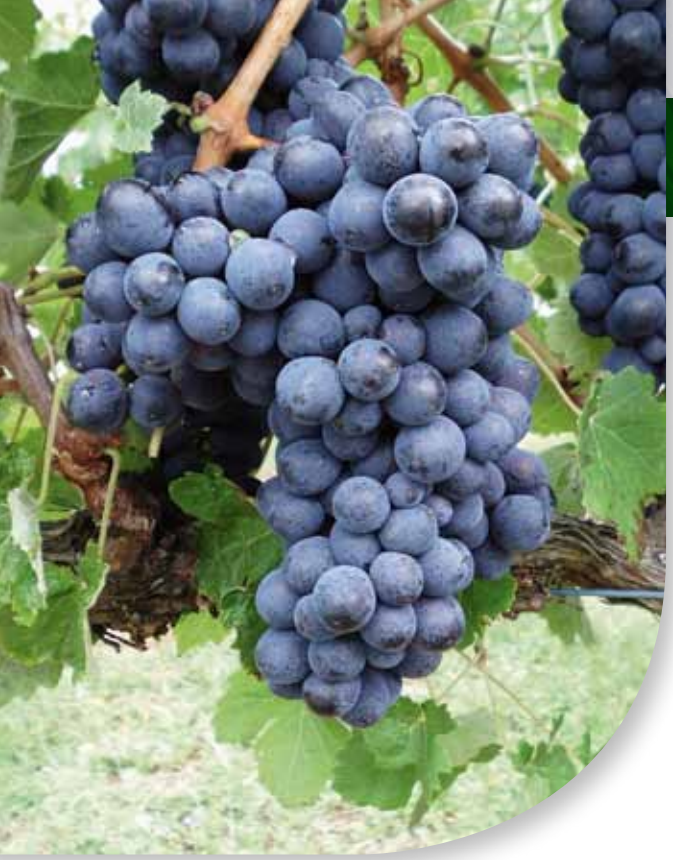
Results from a consumer survey showed that 66 per cent of respondents liked the aroma, 69 per cent liked the flavour, 52 per cent liked the body, 65 per cent liked the style and 74 per cent found the variety to have commercial potential.

Wine judging results

2009 Winemakers Panel	2010 Timber Towns Wine Show	2010 Australian Alternative Variety Wine Show	2010 Qantas Wine Show	2011 Timber Towns Wine Show
15.6	16.0	14.5	15.6	15.9

Production characteristics

Productivity	Medium - High	Berry weight	Medium
Bunch weight	Medium	Fruit yield/vine	5.6 kg
Disease susceptibility	Low	Equivalent yield/ha	9.4 t
Bunch compaction	Medium	Vigour	Medium
Juice TSS (°Brix)	22.9	Juice Baume	12.7
Juice pH	3.1	Juice TA g/L	6.9



Barbera Clone: AT84

Barbera is an ancient Italian variety originating from the hills of Monferrato in central Piedmont. It accounts for 50 per cent of all red cultivars grown in Piedmont. Barbera is also planted in Argentina, Bolivia, Brazil, America, Uruguay and Australia. The variety is naturally high in acidity and anthocyanins; wines are low in tannin in comparison to colour depth. The wines are medium-bodied with distinctive plum, ripe cherry, currant and prune aromas.

Timing of key phenology stages at Manjimup.

Budburst (E-L 4)	Full bloom (E-L 23)	Veraison (E-L 35)	Harvest (E-L 38)
Early-mid September	Early December	Mid-February	Mid-April

Production information

Barbera vines showed good establishment in trials at Manjimup, with the production of large crops in early development. Fruit from Barbera vines can be susceptible to sunburn if highly exposed within the canopy, however Barbera experiences low levels of disease. Acid production in Barbera fruit can be high, resulting in the delay of harvest. On average, Barbera contains 3.2 g/L of malic acid in fruit at harvest. Barbera wines display spicy plum and dark fruit aromas, are medium-bodied with a firm acid structure, fine tannin, raspberry and cherry flavours.

Production characteristics

Productivity	Medium	Berry weight	High
Bunch weight	High	Fruit yield/vine	5.5 kg
Disease susceptibility	Low	Equivalent yield/ha	9.2 t
Bunch compaction	Medium	Vigour	Medium
Juice TSS (°Brix)	26.5	Juice Baume	14.7
Juice pH	3.2	Juice TA g/L	9.4

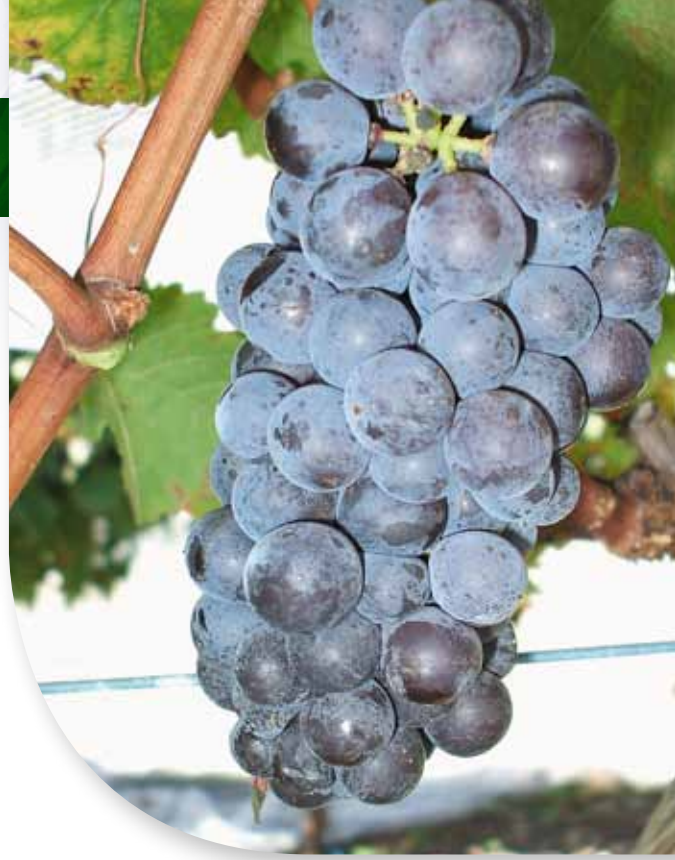
Wine sensory assessment

Results from a consumer survey showed that 68 per cent of respondents liked the aroma, 83 per cent liked the flavour, 82 per cent liked the body, 85 per cent liked the style and 68 per cent found the variety to have commercial potential.

Wine judging results

2009 Winemakers Panel	2010 Timber Towns Wine Show	2010 Australian Alternative Variety Wine Show	2010 Qantas Wine Show	2011 Timber Towns Wine Show
14.9	15.7	18.5	16.2	16.3

Brachetto Clone: H102



Found growing in the Piedmont region in Italy, Brachetto is also known as Borgogna and Braquet (France). Brachetto is thought to be the red version of moscato. It is a light-coloured grape that produces distinctive wines including Brachetto d'Acqui, which is a fizzy, light-bodied, low-alcohol wine with strawberry-like characteristics in both colour and flavour.

Timing of key phenology stages at Manjimup

Budburst (E-L 4)	Full bloom (E-L 23)	Veraison (E-L 35)	Harvest (E-L 38)
Mid-September	Early-mid December	Early February	Mid-late March

Production information

Brachetto vines showed moderate establishment in trials at Manjimup, producing medium-sized canopies with thin shoots. Brachetto usually produces medium to large bunches of thin-skinned grapes. In comparison to other red grapes, Brachetto grapes achieve sugar accumulation early, although the fruit has a low anthocyanin content, producing the characteristic 'strawberry' coloured wines. Brachetto grapes and wine are intensely perfumed with muscat, strawberry, rose and spicy aromas and flavours. Wines are light in colour even after fermentation on skins.

Production characteristics

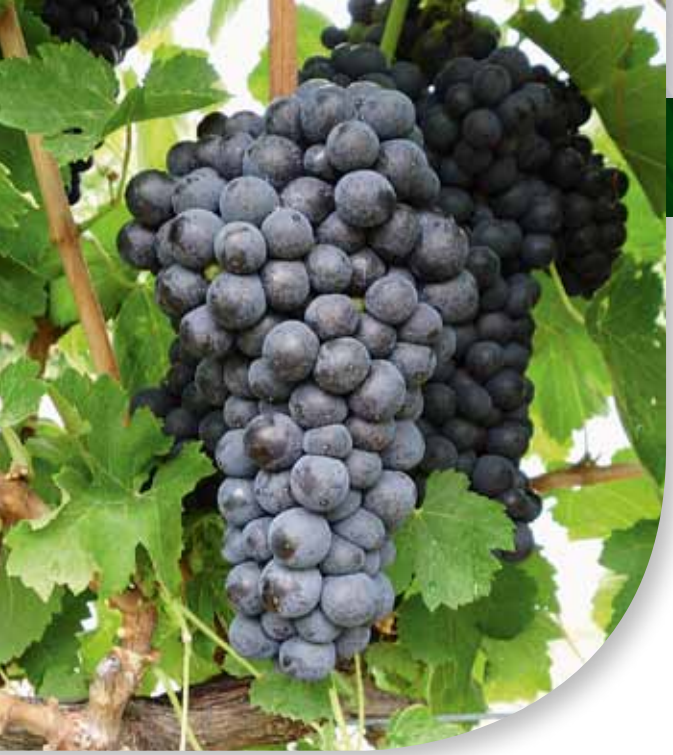
Productivity	Medium - High	Berry weight	Medium
Bunch weight	Medium - High	Fruit yield/vine	5.5 kg
Disease susceptibility	Medium - High	Equivalent yield/ha	9.2 t
Bunch compaction	Medium - High	Vigour	Medium
Juice TSS (°Brix)	24.8	Juice Baume	13.8
Juice pH	3.1	Juice TA g/L	9.6

Wine sensory assessment

Results from a consumer survey showed that 58 per cent of respondents liked the aroma, 79 per cent liked the flavour, 58 per cent liked the body, 55 per cent liked the style and 57 per cent found the variety to have commercial potential.

Wine judging results

2010 Australian Alternative Variety Wine Show	2010 Qantas Wine Show	2011 Timber Towns Wine Show
14.2	14.2	15.0



Durif Clone: H7V13

Discovered by François Durif in 1880, DNA analysis has confirmed Durif is a cross between Shiraz and Peloursin. Its origin is the Rhone Valley but because of its susceptibility to Botrytis it performs much better in warmer, drier regions. Durif is known as 'Petite Syrah' in America and Israel. Wines tend to have high levels of tannins that enable cellaring potential. Typically the wines are firm, high in alcohol, full-flavoured with a degree of acidity.

Dates of key phenology stages at Manjimup

Budburst (E-L 4)	Full bloom (E-L 23)	Veraison (E-L 35)	Harvest (E-L 38)
Mid-late September	Early-mid December	Mid-late February	Early April

Production information

Durif rootlings showed good establishment in trials at Manjimup. Durif vines produced large fruit crops early in development, however vines showed more balance in fruit-set and development after establishment for six years. Durif is highly susceptible to Botrytis and develops highly compact bunches with large wings. Fruit has dark berry flavours, firm acid, grainy tannins with chewy skins. Durif wines have ripe plum, dark berry, subtle spice and dried fruit aromas. Wines are medium-bodied, firm with fine tannins and have flavours of dark cherries and plum.

Production characteristics

Productivity	Medium - High	Berry weight	Medium
Bunch weight	High	Fruit yield/vine	3.8 kg
Disease susceptibility	Medium - High	Equivalent yield/ha	6.3 t
Bunch compaction	High	Vigour	Medium
Juice TSS (°Brix)	22.5	Juice Baume	12.5
Juice pH	3.3	Juice TA g/L	7.5

Wine judging results

2009 Winemakers Panel	2010 Timber Towns Wine Show	2010 Qantas Wine Show
15.6	16.1	14.7

Fer Clone: 10-26A1

Also known as Fer Servadou, this French variety is grown throughout the south-west of France. The word 'fer' in French means 'iron'; this is derived from the vines' hard, tough trunks and canes rather than the resulting wines. Fer produces concentrated wines of good colour with a medium to full body. Wine aroma and flavour are typified by dark fruits and spice with soft tannins.

Timing of key phenology stages at Manjimup

Budburst (E-L 4)	Full bloom (E-L 23)	Veraison (E-L 35)	Harvest (E-L 38)
Late September	Early December	Late February	Mid-late April

Production information

Fer vines established well in trials at Manjimup, producing adequate crops of disease-free fruit. However, fruit yield produced from Fer vines decreased during this evaluation with management of vines subsequently changed to cane-pruning to facilitate additional fruit production. Fruit produced by Fer vines can have difficulty in achieving sugar accumulation in later ripening years, however Fer shows low susceptibility to Botrytis. Fruit contains mulberry flavours with firm, crunchy skins and phenolic characteristics. Wines are medium-bodied, have soft tannins with white pepper and cherry aromas and flavours.

Production characteristics

Productivity	Medium	Berry weight	Medium
Bunch weight	Medium	Fruit yield/vine	7 kg
Disease susceptibility	Low	Equivalent yield/ha	11.6 t
Bunch compaction	Medium - High	Vigour	Medium - High
Juice TSS (°Brix)	22.9	Juice Baume	12.7
Juice pH	3.4	Juice TA g/L	6.6

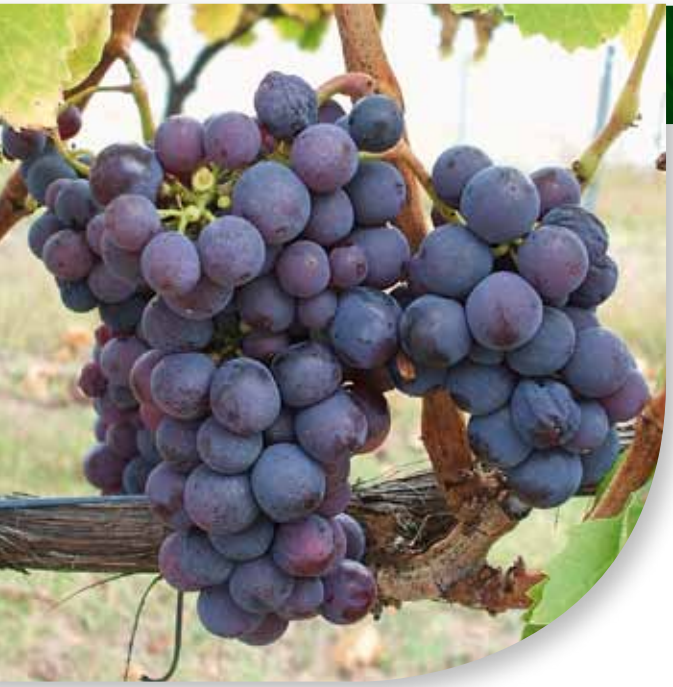
Wine judging results

2009 Winemakers Panel	2010 Timber Towns Wine Show
14.7	15.4

Furmint Clone: E2V11

Furmint, taken from the word ‘froment’ meaning wheat-gold colour, is believed to have originated from Hungary where it has contributed to producing the famous Tokaji Aszú wines for centuries. Its thin skin, high acid and susceptibility to Botrytis makes Furmint ideally suited to producing sweet botrytised wine. However, the dry table wines are well regarded. Typically these wines are high in alcohol, full-bodied, rich, high acid with citrus and stone-fruit flavours.

Furmint vines at Manjimup displayed an upright growth habit and good establishment. In Manjimup, Furmint fruit routinely displays poor fruit-set and investigation as to the cause of this issue, including nutrition analysis, has not provided a remedy. As well as poor fruit-set, Furmint shows a high susceptibility to powdery mildew early in the season. For this reason, Furmint has performed poorly in the Manjimup trials and has not been suitable to the area. Wines display peach characters with an overall simple vinous flavour.



Kadarka Clone: F1

Kadarka is believed to have been introduced into Hungary during the Turkish occupation. It is grown in most Eastern European countries but the best wines come from the Szekszárd and Villány wine regions of Hungary. It is known as Skadarska in Yugoslavia, Gamza in Bulgaria and Cadarca in Romania. When fully ripe, Kadarka produces wines of medium to full body, fiery spiciness and fine tannins worthy of aging.

Kadarka vines showed good establishment in trials at Manjimup, however fruit produced by these vines routinely fails to reach sugar maturity, therefore wines have not been produced from this variety. In some years, fruit produced by Kadarka also fails to achieve consistent anthocyanin production in skins, often retaining a green colour. Kadarka is highly susceptible to Botrytis and becomes infected early in the season with skins that easily ‘slip’ from berries. Kadarka vines have an upright growth habit and produce numerous bunches with a medium level of compaction.

Gamay Clone: 284

Gamay is thought to have originated in the Burgundy wine region where it was outcast in the 14th century on the charge of producing inferior wines. Gamay established in the Beaujolais region where it found its identity; plantings can also be found in the Loire Valley. Gamay wines are typical of the Beaujolais style-light purple in colour, notable high acid, low tannin, light-bodied, fragrant with freshly picked red berry, peach and banana characters.

Timing of key phenology stages at Manjimup

Budburst (E-L 4)	Full bloom (E-L 23)	Veraison (E-L 35)	Harvest (E-L 38)
Mid-September	Mid-December	Mid-February	Early April

Production information

Gamay vines showed poor establishment in trials at Manjimup. Gamay rootlings were weak and many failed to establish requiring replanting. The first year of fruit production for winemaking from this variety therefore occurred in 2009. Gamay vines produced numerous small bunches per shoot requiring fruit thinning in crowded areas. Gamay bunches are highly compact containing medium berries. Fruit displays ripe berry and spicy characters, producing light-bodied savoury wines with firm acid and herbal, strawberry and briar flavours.

Production characteristics

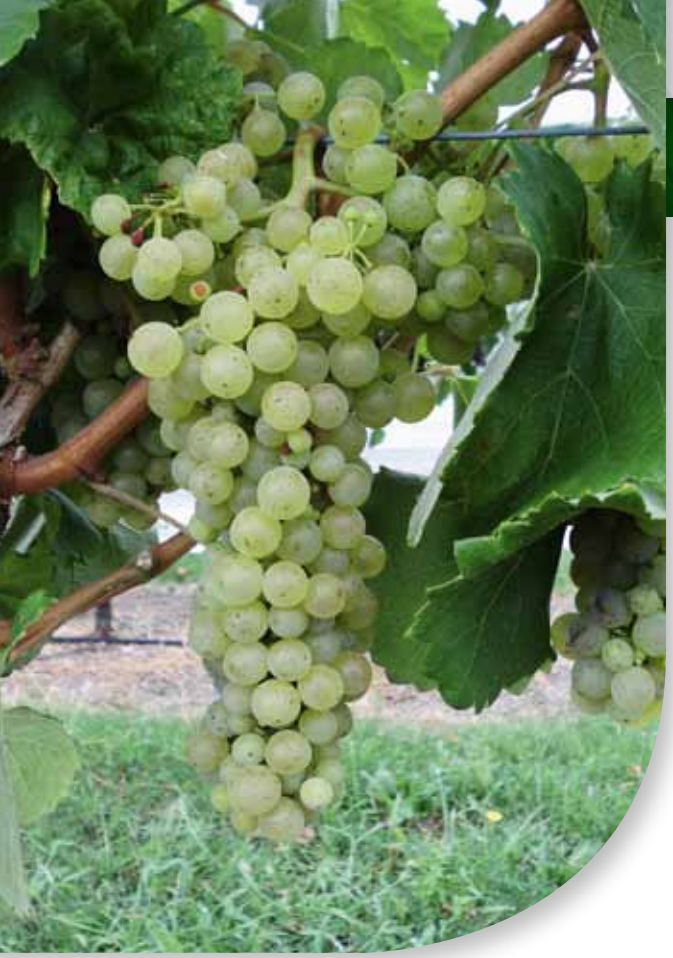
Productivity	Medium - High	Berry weight	Medium
Bunch weight	High	Fruit yield/vine	7.7 kg
Disease susceptibility	Medium	Equivalent yield/ha	12.8 t
Bunch compaction	High	Vigour	Medium
Juice TSS (°Brix)	22.7	Juice Baume	12.6
Juice pH	3.1	Juice TA g/L	8.9

Wine sensory assessment

Results from a consumer survey showed that 53 per cent of respondents liked the aroma, 47 per cent liked the flavour, 47 per cent liked the body, 35 per cent liked the style and 37 per cent believed the variety has commercial potential.

Wine judging results

2009 Winemakers Panel	2010 Timber Towns Wine Show	2010 Australian Alternative Variety Wine Show	2010 Qantas Wine Show
14.5	15.1	13.7	14.6



Harslevelu Clone: LN-B

Pronounced ‘harsh-leh-veh-loo’, translated the name means ‘lime leaf’. It is native to the Carpathian Basin and is famous for its contribution to the sweet Tokaji Aszú wines from Hungary. Combined with Furmint it gives perfume, spice and smoothness to the blend. Typical table wines are highly perfumed, spicy, viscous and full-bodied.

Timing of key phenology stages at Manjimup

Budburst (E-L 4)	Full bloom (E-L 23)	Veraison (E-L 35)	Harvest (E-L 38)
Early–mid September	Mid-December	Late February	Early April

Production information

Harslevelu vines grown at MHRI showed an erect growth habit that provided ease with canopy management. The variety is highly fertile producing many large, long bunches that often have large wings and shoulders. Berries are medium in size and bunches have a low level of compaction. Due to the large bunches set on Harslevelu vines, the variety requires substantial crop thinning to adequately ripen fruit. Harslevelu is susceptible to powdery mildew, with early control required to avoid berry damage. The variety may be more suited to warmer areas, although it requires canopy management to prevent sunburn of fruit. At harvest, Harslevelu fruit tastes tropical with muscat, lychee and lemon citrus flavours. Wines have a soft front palate with aromas and flavours of peaches and pears with underlying citrus characters and a crisp finish.

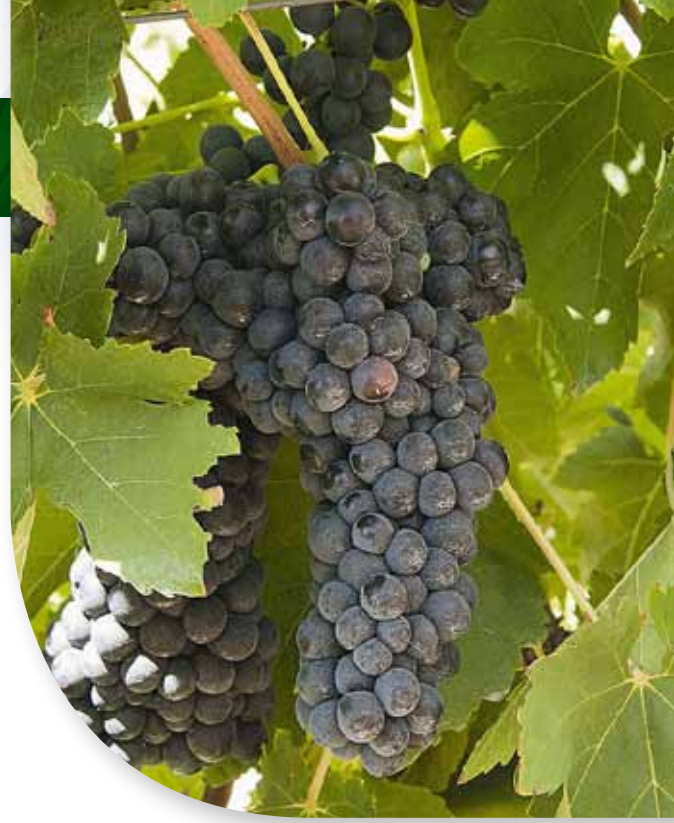
Production characteristics

Productivity	High	Berry weight	Medium
Bunch weight	High	Fruit yield/vine	6.4 kg
Disease susceptibility	Medium	Equivalent yield/ha	10.6 t
Bunch compaction	Low	Vigour	Low
Juice TSS (°Brix)	23.9	Juice Baume	13.3
Juice pH	3.2	Juice TA g/L	8.0

Wine judging results

2009 Winemakers Panel	2010 Timber Towns Wine Show
16.4	16.4

Lagrein Clone: H9V9



Lagrein is native to the valleys of northern Italy in the Trentino-Alto Adige region and was traditionally rarely found outside this area. Lagrein typically produces wines with good acidity, generous flavours and good tannin. Lagrein produces medium-bodied table wines that show intense colour, good body with rich berry characters. Rosé styled wines from Lagrein are elegant, fruity and floral.

Timing of key phenology stages at Manjimup

Budburst (E-L 4)	Full bloom (E-L 23)	Veraison (E-L 35)	Harvest (E-L 38)
Mid-September	Early December	Mid-February	Early April

Production information

Lagrein vines grow well at Manjimup to produce large fruit crops early in establishment. Lagrein bunches are low in compaction and present a low susceptibility to Botrytis however they can be adversely affected by powdery mildew in crowded canopy areas. Lagrein wines have cherry, dark berry, violet and plum aromas, are medium-bodied with chalky tannins, cherry, plum and dark chocolate flavours.

Production characteristics

Productivity	Medium	Berry weight	Medium
Bunch weight	High	Fruit yield/vine	7 kg
Disease susceptibility	Low - Medium	Equivalent yield/ha	11.6 t
Bunch compaction	Low	Vigour	Medium
Juice TSS (°Brix)	25.0	Juice Baume	13.9
Juice pH	3.4	Juice TA g/L	6.7

Wine judging results

2010 Qantas Wine Show	2011 Timber Towns Wine Show
16.2	16.3

Wine sensory assessment

Results from a consumer survey showed that 95 per cent of respondents liked the aroma, 100 per cent liked the flavour, 95 per cent liked the body, 95 per cent liked the style and 80 per cent found the variety to have commercial potential.

Pinot Gris Clone: D1V7

Pinot Gris is a mutation of Pinot Noir with 'gris' referring to the grey (pinkish) colour of the berries. The variety is known as Pinot Grigio in Italy although it originates from the Burgundy region in France and is currently gaining rapid popularity in Australia. Pinot Gris produces a white wine ranging from light, crisp with citrus characters to a richer style with greater body, perfume and flavour. Wine may also vary from a straw to light copper colour.

Timing of key phenology stages at Manjimup

Budburst (E-L 4)	Full bloom (E-L 23)	Veraison (E-L 35)	Harvest (E-L 38)
Mid-September	Mid-late November	Late January	Late February

Production characteristics

Productivity	High	Berry weight	Low
Bunch weight	Medium	Fruit yield/vine	3.8 kg
Disease susceptibility	Low - Medium	Equivalent yield/ha	6.3 t
Bunch compaction	High	Vigour	Low - Medium
Juice TSS (°Brix)	22.9	Juice Baume	12.7
Juice pH	3.1	Juice TA g/L	7.5

Production information

Pinot Gris showed good field establishment to produce highly fertile vines with early cropping potential. Within the first two years of planting vine vigour was very low, with fruit load reduced to enable vine establishment. Pinot Gris vines produce small canopies with numerous grape bunches that are compact and contain small berries. Pinot Gris ripens very early in the season and needs to be monitored for protection from birds. Pinot Gris was a late inclusion in the evaluation and could yield more fruit when vines are mature. Due to its compact bunches, Pinot Gris can be prone to Botrytis. Fruit can be prone to sunburn in exposed canopies. Berry flavours were found to be subdued, the wines showed distinct pear and apple aromas which continued onto the palate.

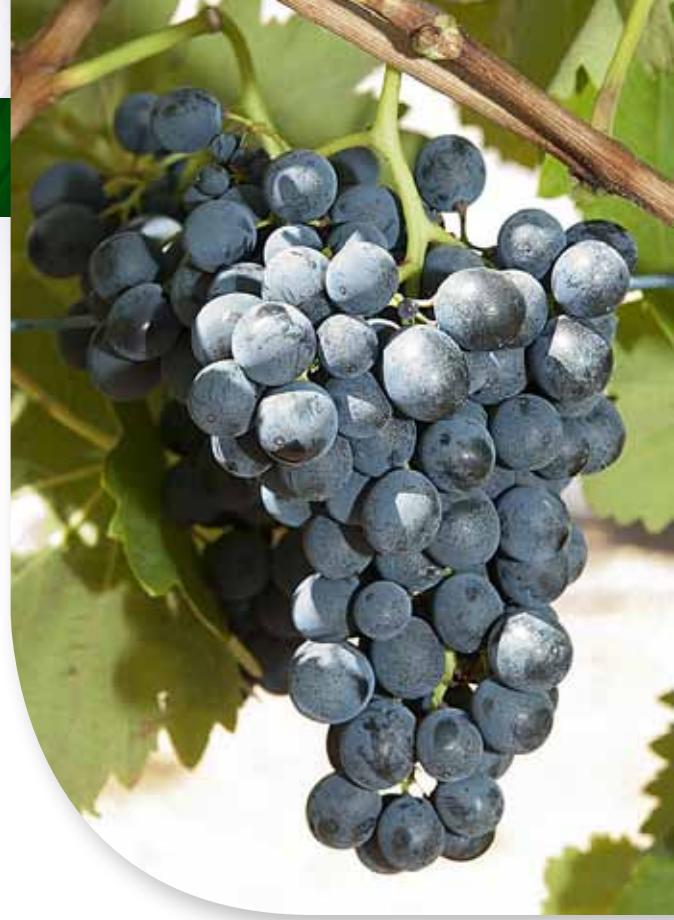
Wine sensory assessment

Results from a consumer survey showed that 68 per cent of respondents liked the aroma, 68 per cent liked the flavour, 81 per cent liked the body, 70 per cent liked the style and 78 per cent found the variety to have commercial potential.

Wine judging results

2010 Qantas Wine Show	2011 Timber Towns Wine Show
14.9	15.9

Saperavi Clone: I11V10



Saperavi originates from the Kakhetti region in central-eastern Georgia. A characteristic of the variety is its high anthocyanin content, which gives rise to the name Saperavi meaning 'pigment' or 'stain' in Georgian. It is a very important variety for Georgia, where it reportedly accounts for 80 per cent of all red wine production. Wines have great depth of colour, high acid, plum, berry and floral notes, are well structured with impressive ageing capacity.

Timing of key phenology stages at Manjimup

Budburst (E-L 4)	Full bloom (E-L 23)	Veraison (E-L 35)	Harvest (E-L 38)
Early September	Early December	Mid-February	Mid-late April

Production information

Saperavi vines displayed poor and slow establishment in trials at Manjimup, producing small canopies with low yields. However, Saperavi produces very loose bunches of fruit that are low in disease incidence with a deep, inky red fruit colour. Approaching harvest maturity, Saperavi fruit shrivels to a high degree. Berry shrivel can be high in later ripening years, resulting in reduced yield. Fruit has ripe, rich and concentrated berry and plum flavours. Saperavi wines are deep and inky in colour; the aroma is lifted with floral violet tones, cherry and citrus. Wines are medium-bodied, have supple tannins with blackberry and cherry flavours.

Production characteristics

Productivity	Medium	Berry weight	Medium
Bunch weight	Medium	Fruit yield/vine	7.4 kg
Disease susceptibility	Low	Equivalent yield/ha	12.3 t
Bunch compaction	Low	Vigour	Medium
Juice TSS (°Brix)	26.6	Juice Baume	14.8
Juice pH	3.3	Juice TA g/L	8.1

Wine sensory assessment

Results from a consumer survey showed that 85 per cent of respondents liked the aroma, 96 per cent liked the flavour, 96 per cent liked the body, 91 per cent liked the style and 96 per cent found the variety to have commercial potential.

Wine judging results

2009 Winemakers Panel	2010 Timber Towns Wine Show	2010 Qantas Wine Show	2011 Timber Towns Wine Show
17.0	15.9	15.9	16.3

Savagnin Blanc Clone: Galicia 1989

Savagnin Blanc pronounced 'sah-vah-nyan', is a white wine grape predominately grown in the Jura region of France. In France, the Savagnin Blanc wines often undergo an aging process in oak to allow concentration of flavours. These wines are known for their delicate, nutty flavours that can age for decades. This variety was formerly, and mistakenly, known as Albarino in Australia, until it was recently identified as Savagnin Blanc.

Timing of key phenology stages at Manjimup

Budburst (E-L 4)	Full bloom (E-L 23)	Veraison (E-L 35)	Harvest (E-L 38)
Mid-September	Early December	Mid-late February	Mid-late March

Production information

In the Manjimup trial, Savagnin Blanc rootlings established well, producing medium to large-sized canopies with medium-sized berries. Savagnin Blanc vines produce numerous small bunches that require a moderate level of bunch thinning. As such, this variety is highly fertile and requires bunch thinning to moderate crop level. Fruit has low tropical flavour intensity with no distinct varietal character. Wines produced are aromatic with apple, floral and estery notes; the palate has an attractive texture and shows tangy citrus, green apple and pear flavours.

Production characteristics

Productivity	Medium	Berry weight	Medium
Bunch weight	Medium	Fruit yield/vine	4.6 kg
Disease susceptibility	Low	Equivalent yield/ha	7.7 t
Bunch compaction	Low - Medium	Vigour	Medium - High
Juice TSS (°Brix)	23.0	Juice Baume	12.8
Juice pH	3.1	Juice TA g/L	7.0

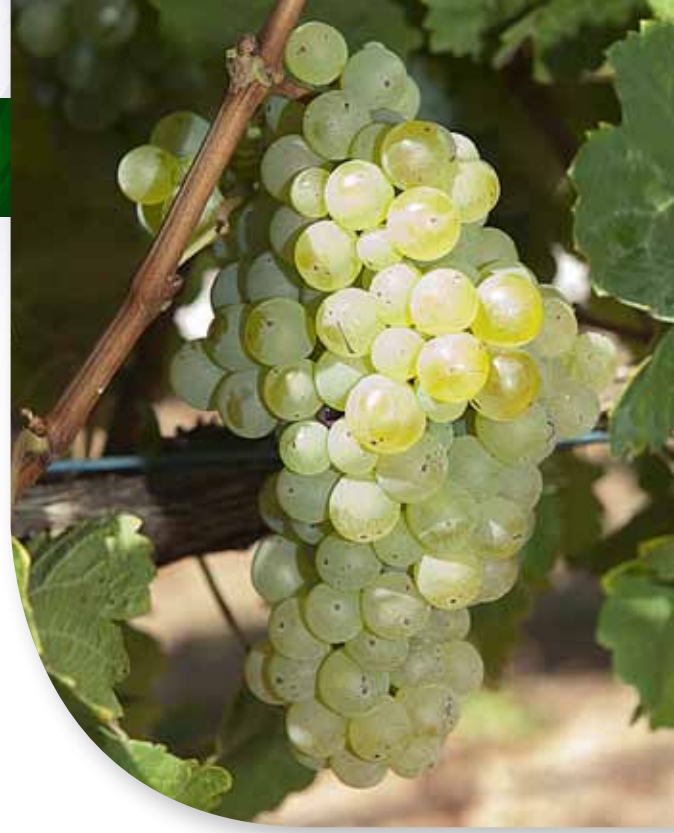
Wine sensory assessment

Results from a consumer survey showed that 63 per cent of respondents liked the aroma, 78 per cent liked the flavour, 64 per cent liked the body, 76 per cent liked the style and 85 per cent found the variety to have commercial potential.

Wine judging results

2009 Winemakers Panel	2010 Qantas Wine Show	2011 Timber Towns Wine Show
15.5	15.3	16.5

Scheurebe Clone: Merbein



Scheurebe, pronounced 'shoy-ray-beh', was created in 1916 by the German vine breeder Georg Scheu, with Riesling in its parentage. It is predominately grown in the German wine regions of Pfalz, Rheinhessen. Scheurebe is commonly used to make dessert wines with lively, aromatic and fruity dry table wines becoming more popular. The variety is known for its distinct blackcurrant aroma and is often compared to Riesling. A characteristic of the variety is low to moderate acidity.

Timing of key phenology stages at Manjimup

Budburst (E-L 4)	Full bloom (E-L 23)	Veraison (E-L 35)	Harvest (E-L 38)
Early-mid September	Early December	Mid-February	Mid-March

Production information

In Manjimup, Scheurebe vines produced medium to large-sized bunches with large berries. Fruit was generally free of disease (powdery mildew and Botrytis) at harvest however Botrytis was shown to develop in fruit that was harvested later in the season. Scheurebe produces medium to large-sized canopies that required the removal of crowded and senesced leaves within the canopy to allow airflow to fruit. Fruit has high flavour intensity with lychee, passionfruit and tropical flavours. Wines display orange blossom, sherbet, pear and lime aromas with a fresh, crisp palate of citrus, muscat and apricot flavours.

Production characteristics

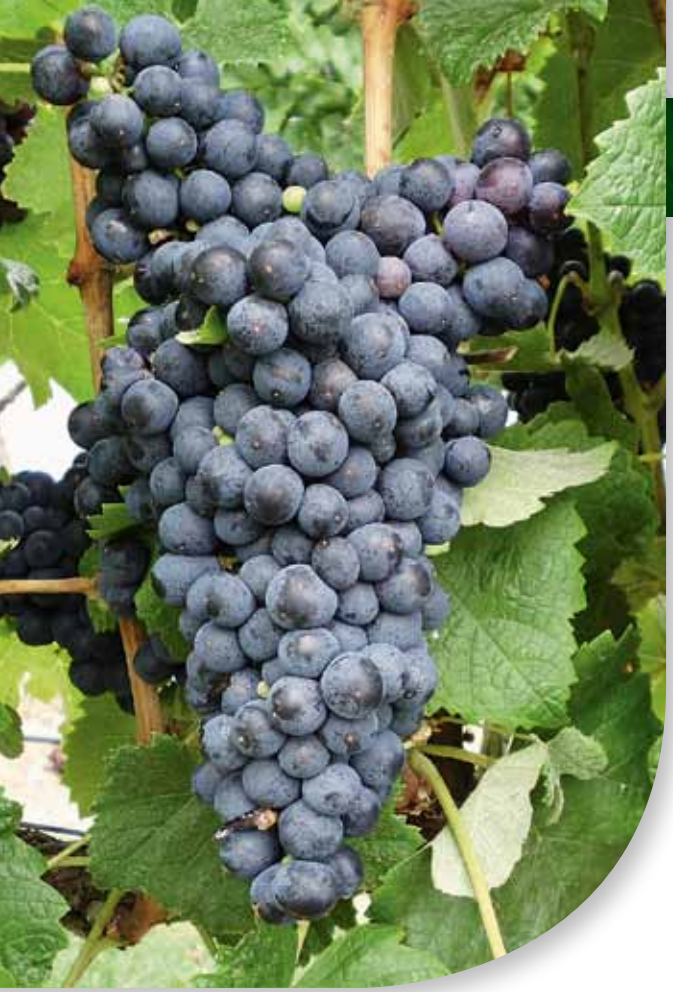
Productivity	High	Berry weight	Medium - High
Bunch weight	High	Fruit yield/vine	7.9 kg
Disease susceptibility	Low - Medium	Equivalent yield/ha	13.2 t
Bunch compaction	Medium - High	Vigour	Medium - High
Juice TSS (°Brix)	21.1	Juice Baume	11.7
Juice pH	3.1	Juice TA g/L	6.2

Wine sensory assessment

The consumer group was presented with three Scheurebe wines produced from the 2010 vintage. Two wines were dry table wines and the third a late-picked style with 43 g/L residual sugar. The group preferred the late-picked style where 79 per cent of respondents liked the aroma, 86 per cent liked the flavour, 83 per cent liked the body, 76 per cent liked the style and 92 per cent found the variety to have commercial potential.

Wine judging results

2009 Winemakers Panel	2010 Timber Towns Wine Show	2010 Australian Alternative Variety Wine Show	2010 Qantas Wine Show	2011 Timber Towns Wine Show
16.0	15.3	15.7	15.1	15.9



Tannat Clone: H9V3

Tannat is native to the south-west of France. It is also known as Moustrou, Moustroun, Madiran (France), Bordeleza, Belcha (Spain) and Harriague (Uruguay). Uruguay has adopted Tannat as a major variety, which significantly contributes to the country's red wine production. Tannat is also grown in Argentina, Australia, Brazil, Italy and America. As the name suggests, Tannat is noted for its very high tannin levels. Tannat produces full-bodied wines deep in colour, with firm tannins and spicy berry characters.

Timing of key phenology stages at Manjimup

Budburst (E-L 4)	Full bloom (E-L 23)	Veraison (E-L 35)	Harvest (E-L 38)
Mid-late September	Mid-late December	Mid-February	Early-mid April

Production information

Tannat vines displayed weak establishment in trials at Manjimup with some rootlings failing to establish. However, once established, and with adequate nutrient application vines produce large compact bunches. Grapevines can be low-yielding, producing poorly-set fruit in unfavourable weather conditions. Tannat produces a prominent secondary crop of berries that fail to ripen and vines can be susceptible to powdery mildew. Vines require limited canopy management and crop thinning of secondary grape bunches. Fruit has flavours of ripe berry, strawberry, spice with grassy skins and fine tannins. Wines are concentrated, have medium body and soft tannins with sweet cherry, raspberry, plum and currant aromas and flavours.

Production characteristics

Productivity	Low - Medium	Berry weight	Medium
Bunch weight	High	Fruit yield/vine	6.5 kg
Disease susceptibility	Medium	Equivalent yield/ha	10.8 t
Bunch compaction	High	Vigour	Medium - High
Juice TSS (°Brix)	24.5	Juice Baume	13.6
Juice pH	3.1	Juice TA g/L	8.5

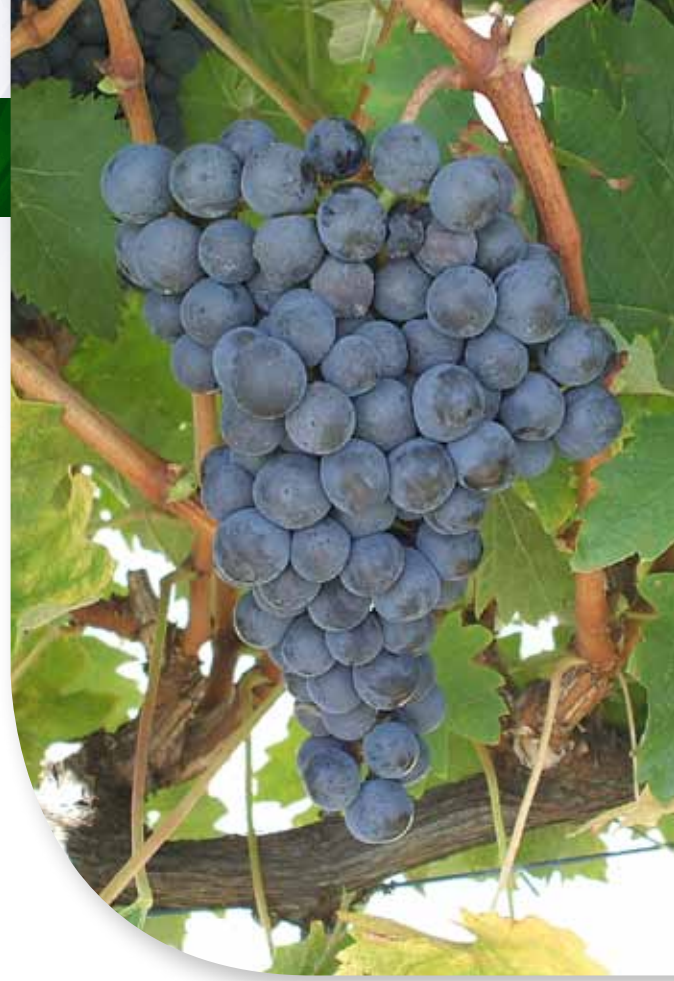
Wine sensory assessment

Results from a consumer survey showed that 63 per cent of respondents liked the aroma, 70 per cent liked the flavour, 73 per cent liked the body, 64 per cent liked the style and 64 per cent found the variety to have commercial potential.

Wine judging results

2009 Winemakers Panel	2010 Timber Towns Wine Show	2010 Australian Alternative Variety Wine Show	2010 Qantas Wine Show	2011 Timber Towns Wine Show
16.0	15.5	15.8	15.0	16.3

Tempranillo Clone: Requena



Tempranillo is native to northern Spain; it is typified as having thick skins and low acid. Tempranillo is currently enjoying a surge in popularity across the world, with plantings expanding to countries such as South Africa, America, Chile, Argentina and Australia. Wines are typically deep-coloured with characteristics of berry jam, strawberry, spice and fresh tobacco.

Timing of key phenology stages at Manjimup

Budburst (E-L 4)	Full bloom (E-L 23)	Veraison (E-L 35)	Harvest (E-L 38)
Mid-late September	Early-mid December	Early-mid February	Early-mid April

Production information

Tempranillo displayed strong establishment in trials at Manjimup. Early in development, vines produced large vigorous canopies with large leaves, trunks and grape bunches. Tempranillo vines generally produce disease-free fruit with long bunches and requires attention to canopy management. The variety also produces a number of small secondary bunches. Towards harvest, the oldest leaves of Tempranillo vines show prominent senescence. Fruit has fresh berry flavours with chewy astringent skins. Tempranillo wines have ripe cherry, raspberry and chocolate aromas producing a medium-bodied style, grainy tannins with Black Forest cake and berry flavours.

Production characteristics

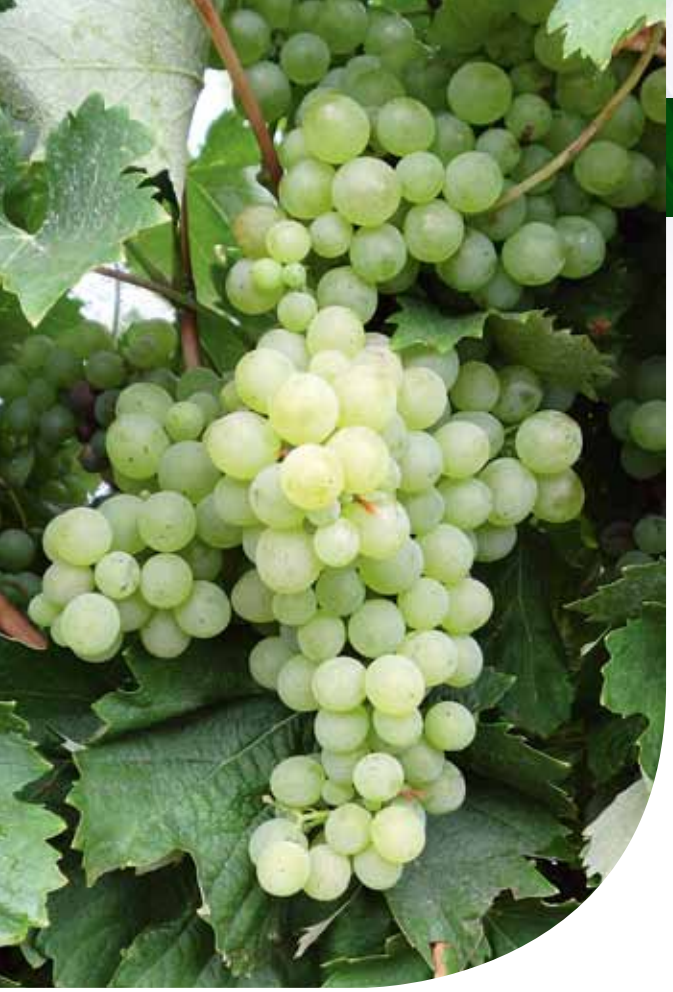
Productivity	Medium - High	Berry weight	High
Bunch weight	High	Fruit yield/vine	5.3 kg
Disease susceptibility	Medium	Equivalent yield/ha	8.8 t
Bunch compaction	Medium	Vigour	Medium - High
Juice TSS (°Brix)	23.8	Juice Baume	13.5
Juice pH	3.4	Juice TA g/L	7.3

Wine sensory assessment

Results from a consumer survey showed that 48 per cent of respondents liked the aroma, 50 per cent liked the flavour, 46 per cent liked the body, 40 per cent liked the style and 54 per cent found the variety to have commercial potential.

Wine judging results

2009 Winemakers Panel	2010 Timber Towns Wine Show
16.6	16.2



Vermentino Clone: H62.1LN

Vermentino is thought to originate in Italy, with the Liguria region and the Mediterranean islands of Corsica and Sardinia best recognized for the variety's production. Vermentino is a high-acid variety with high yields and vigour. The variety is known to produce two wine styles, including a fresh fruity wine for early drinking and a complex barrel-fermented wine with aging capacity. Vermentino is known for its good acidity and body, with the wines being perfumed and lively.

Timing of key phenology stages at Manjimup

Budburst (E-L 4)	Full bloom (E-L 23)	Veraison (E-L 35)	Harvest (E-L 38)
Late September	Early December	Late February	Early-mid April

Production information

Vermentino showed good establishment in trials at Manjimup. The variety is highly fertile, producing a large crop with inflorescence and flowering often seen to also develop on lateral shoots. Vermentino is late-ripening, producing large grape bunches with large berries and requires bunch thinning at veraison. Canopies can be compact and require leaf plucking to allow airflow and spray penetration, however the incidence of powdery mildew on fruit is low. Fruit has citrus, lychee and melon flavours with spicy skins. The wine has aromas of pink grapefruit, spice and lemon rind, the palate has a fine acid core with good texture.

Production characteristics

Productivity	High	Berry weight	High
Bunch weight	High	Fruit yield/vine	5 kg
Disease susceptibility	Low	Equivalent yield/ha	8.3 t
Bunch compaction	Low - Medium	Vigour	Medium - High
Juice TSS (°Brix)	21.8	Juice Baume	12.1
Juice pH	3.3	Juice TA g/L	6.8

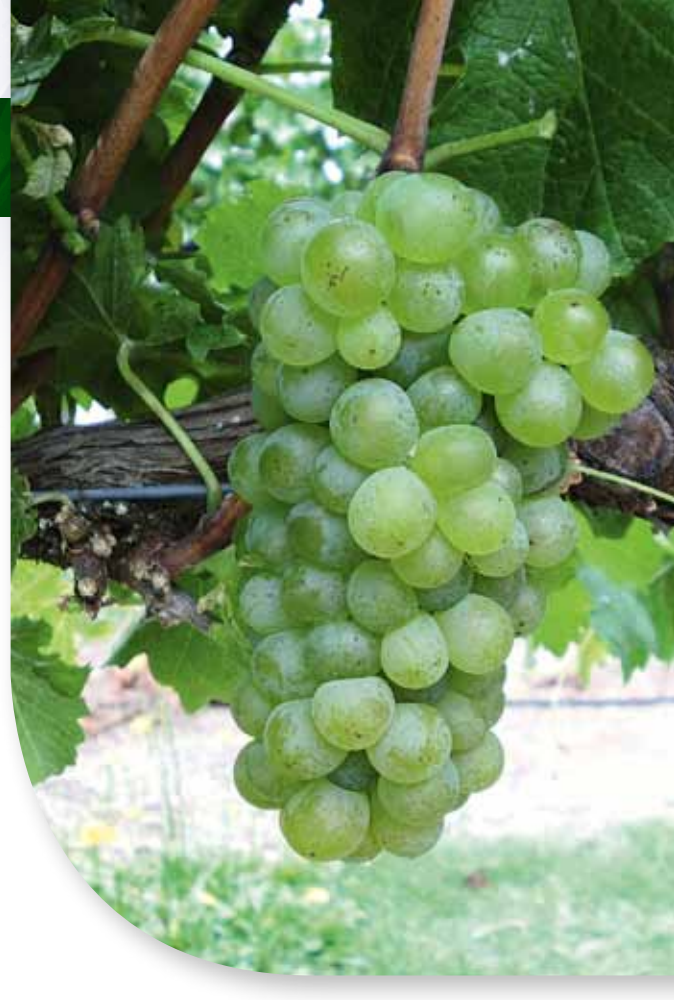
Wine sensory assessment

Results from a consumer survey showed that 58 per cent of respondents liked the aroma, 76 per cent liked the flavour, 64 per cent liked the body, 70 per cent liked the style and 68 per cent found the variety to have commercial potential.

Wine judging results

2009 Winemakers Panel	2010 Timber Towns Wine Show	2010 Qantas Wine Show	2011 Timber Towns Wine Show
15.5	15.8	15.7	15.9

Viognier Clone: HTK



Viognier is an important grape variety for wine production in Condrieu in the Rhone Valley. In the last twenty years Viognier has made a resurgence, with plantings being found in almost all the major wine producing countries. Viognier is versatile, producing quality wines in a number of styles. Wine styles can exhibit fresh, vibrant fruit characters or full-bodied, complex oak matured wines. Dry white wines can have an intense apricot, peach, pear and floral aroma.

Dates of key phenological stages at Manjimup

Budburst (E-L 4)	Full bloom (E-L 23)	Veraison (E-L 35)	Harvest (E-L 38)
Early-mid September	Early December	Late February	Late March

Production information

In Manjimup, Viognier produced vines with medium-sized canopies and cropping level. Grape berries were medium in size, with exposed grape berry skins browning as harvest advances. Canopies can become dense, requiring management to avoid compaction of leaves within the canopy. Fruit can be later ripening and susceptible to Botrytis. Viognier vines produce fruit with clean citrus and tropical flavours with some astringency in the skins. Wines have a distinct perfumed aroma of apricots, orange blossom and citrus with a crisp palate, attractive juicy texture and persistent flavours of apricot nectar and lemon.

Production characteristics

Productivity	Medium	Berry weight	Medium
Bunch weight	Medium	Fruit yield/vine	6.2 kg
Disease susceptibility	Medium	Equivalent yield/ha	10.3 t
Bunch compaction	Low	Vigour	Medium - High
Juice TSS (°Brix)	22.1	Juice Baume	12.3
Juice pH	3.2	Juice TA g/L	7.1

Wine sensory assessment

Results from a consumer survey showed that 75 per cent of respondents liked the aroma, 79 per cent liked the flavour, 69 per cent liked the body, 77 per cent liked the style and 78 per cent found the variety to have commercial potential.

Wine judging results

2009 Winemakers Panel	2010 Timber Towns Wine Show	2010 Qantas Wine Show
16.7	16.0	15.1

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References

Bailey, P. 2009. *Learning to love the little rascal*, Australian Viticulture, Vol 13, No. 2, pp. 71-78.

Coombe, B.G. 1995. *Adoption of a system for identifying grapevine growth stages*, Australian Journal of Grape and Wine Research No. 1, pp. 100-110.

Day, R. 2008. *Saperavi – the red jewel of Georgia*, Wine Industry Journal, Vol 23, No. 1, pp. 18-19.

Jones, L. (Ed). *Australian producers adopt Saperavi*, Australian Viticulture, Vol 11, No. 5, pp. 66-68.

Mitchell, C. 2008. *Arneis a winner, no matter how you say it*, The Australian and New Zealand Wine Industry Journal, Vol 23, No. 4, pp. 67-82.

Robinson, J. 1996. *Jancis Robinson's guide to winegrapes*, Oxford University Press, Oxford.

Rowley, M. 2009. *Barbera believers dedicated to variety's potential*, Australian Viticulture, Vol 13, No. 1, pp. 73-83.

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