



# *Grapevine clones used in Australia*

**Phil Nicholas**

South Australian Research and Development Institute



**Government of South Australia**  
Primary Industries and Resources SA





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**Acknowledgements**

Financial support for this publication was provided by Grape and Wine Research and Development Corporation.

**Revised**

December 2006

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# 1. Introduction

Many vineyards in Australia have vines with virus infections, which affect both yield and quality and can cause incompatibility between stock and scion in grafted vines. Considering the high cost of establishing a vineyard, which is then expected to last 30 or more years, it is crucial that the best-available planting material is used. In particular, it should be disease-free, genetically-uniform and true-to-type. Vine Improvement programs have been established in each state to provide certified planting material for grower requirements. This publication provides information on the planting material which is available from increase blocks (typically one third hectare or larger in size) through these programs. Clones which are only held in genetic resource collections (typically as 3-4 vines) can be found in the 'National Register of Grapevine Varieties and Clones' published by the Australian Vine Improvement Association (Nicholas 2006a).

## 1.1 Genetic resources in Australia

There were many early introductions of grapevine planting material into Australia, but of particular interest is the wide range of varieties introduced into New South Wales by James Busby in 1832. These early introductions were soon distributed to other states. Phylloxera was first found in Australia in Victoria in 1875. It devastated plantings and necessitated replanting onto resistant rootstocks. However, quarantine restrictions allowed other plantings such as those in South Australia to continue to be of ungrafted vines (Boehm 1996). As a result, the early introductions into Australia are a valuable source of material, which has not been contaminated by the transfer of viruses from infected rootstocks to scions, as has occurred in other countries. Many of the clones now distributed in Australia have been sourced from this material.

A major expansion of grapevine genetic resources occurred in Australia with introductions from overseas from the 1960s to the present time. Much of this material has been sourced from Foundation Plant Services at the University of California, Davis. Other sources have included the Centre for Plant Health at Sidney in Canada and clonal selection programs in France (Boidron 1995), Italy (Mannini 1995) and Germany (Schmidt *et al.* 1995).

Many early introductions into Australia and most of the more recent ones are now in genetic resource collections (Nicholas 2006a). The largest of these are held by CSIRO at Merbein in Victoria and SARDI at Nuriootpa in South Australia. These collections are maintained to retain genetic diversity of those varieties currently used commercially and to preserve those varieties not used at the present time.

## 1.2 Clonal selection

A clone can be defined as a population of plants, all members of which are descendants by vegetative propagation from a single individual. Clonal selection began in Germany in 1876, in France in 1946, and in Italy in the 1960s. In Australia, clonal selection began in the late 1950s in South Australia (McCarthy 1988a, Cirami and Ewart 1995) and these early trials soon led to its adoption in other states. In this publication, where a clone has originated from a SARDI trial, the region and years assessed have been given.

Clones assessed in trials may be local selections or come from overseas programs. Local selections are made from old vineyards of proven performance and quality, by observing vines for desirable characteristics prior to harvest for two or more years and visually checking them for freedom from disease symptoms. In early vine improvement programs in Australia, many selections were not virus-tested prior to their establishment in clonal comparison trials. With the development of rapid, laboratory-based methods for virus detection, candidate clones can now go through sanitary selection, which involves eliminating clones with detrimental viruses and other disease agents, before planting in trials.



### 1.2.1 Sanitary selection

Grapevine viruses detected in sanitary selection procedures were recently reviewed with reference to Australia (Nicholas 2004) and this source should be consulted for more information.

Leafroll viruses are considered the most detrimental with reported yield losses varying from minor to more than 50%. Leafroll viruses can also affect grape quality by causing delayed maturity and reduced fruit colour of red varieties. The most common leafroll-associated virus detected in diagnostic RT-PCR tests in Australia is leafroll 3, followed by leafroll 1 and leafroll 9 (Habibi and Symons 2000, Habibi and Rowhani 2002). Leafroll 2 is less common, but is reported to be involved with the incompatibility of scions grafted onto 5BB Kober. Other leafroll viruses that are less common are leafroll 4, which is found in the Sultana clones H4 and H5 and leafroll 5 found in a clone of Tempranillo.

Rugose wood is a complex disease caused by viruses. It is seen as symptoms on the woody cylinder beneath the bark of the trunk. Symptoms are uncommon on ungrafted rootstocks and scions, but may appear following grafting. They include swelling above the graft union, with a marked difference in diameter between the scion and rootstock and pits or grooves on the woody cylinder. Vine yield and vigour are often reduced. Budburst may be delayed and vines may decline or even die. Water stress in combination with rugose wood and leafroll viruses will increase the severity of symptoms.

The most common rugose wood disorders found in Australia are Rupestris stem pitting and Kober stem grooving. Rupestris stem pitting symptoms have been associated with a virus, which is present in most Australian vineyards, but may not be of major economic significance for vines on their own roots. Grapevine virus A (GVA) causes Kober stem grooving. It can be symptomless in some varieties, but has been associated with Shiraz Disease in South Africa and Australia (Habibi and Randles 2004). Symptoms of Shiraz Disease include delayed budburst, stunted growth, canes which never mature, and leaves with leafroll virus like symptoms that do not drop in winter.

Grapevine fleck virus is common in Australia, but it is often unrecognised because varieties of *V. vinifera* and most rootstocks are symptomless. Fleck can reduce graft take.

Grapevine fanleaf virus is commonly found throughout the world, but not so in Australia (Habibi *et al.* 2001), because the nematode vector *Xiphinema index* is confined to a small area near Rutherglen, Victoria. Fanleaf is very rarely seen in other regions in Australia.

### 1.2.2 Disease elimination

In the past, heat therapy was the only method available to eliminate viruses from grapevines. This involves growing potted vines in heated cabinets at 38°C. Under these conditions replication of viruses is inhibited and new shoot tips may be virus-free. These are removed and mist-propagated. The period of heat treatment required to eliminate different viruses varies, e.g. fanleaf may be eliminated within 30 days, whereas it may take 6 months or longer to eliminate leafroll virus. The names of clones which have been heat-treated may include H or HT and possibly the number of days of heat treatment.

Meristem tip culture was found to be a more successful method of removing leafroll virus. This involves cutting 0.5 mm of shoot tip and culturing it on a sterile medium (Golino *et al.* 1998). Fragmented shoot apex culture (Barlass *et al.* 1982) has been more commonly used in Australia to remove grapevine viruses. The procedure involves fragmenting one mm sections of shoot apices and growing them in a sterile liquid nutrient medium at 27°C and 35°C. Clones, which have gone through this treatment have FSAC added to their name.

### 1.2.3 Genetic selection

Genetic differences between clones may originate from mutations, which occasionally occur in dividing cells. Any bud arising from mutant cells will develop a shoot carrying those cells. If the shoot has obvious debilitating changes, it will normally be rejected for propagation. However, some variants have been selected as being useful, such as the selections Pinot Gris and Pinot Blanc, which are colour mutants of the long-cultivated variety Pinot Noir. Other mutations may be far less obvious.

### 1.2.4 Clonal comparison

Clones found to be free of important viruses by sanitary selection or disease elimination procedures can then be compared in trials in clonal selection programs. These trials must be well-designed with adequate replication to convincingly establish the often small differences between clones (Nicholas 2003). In clonal trials conducted following sanitary selection, clonal differences may be genetic or due to some other factor, such as the presence of unknown pathogens.

In early trials in Australia, clones were mainly selected on the basis of yield, although the analytical measures of fruit composition (Brix, pH, titratable acidity and colour) were also used. In the 1980s, greater importance was placed on evaluation of wine quality and small-lot winemaking was integrated into trials in many Australian selection programs and references are given to these trials where available.

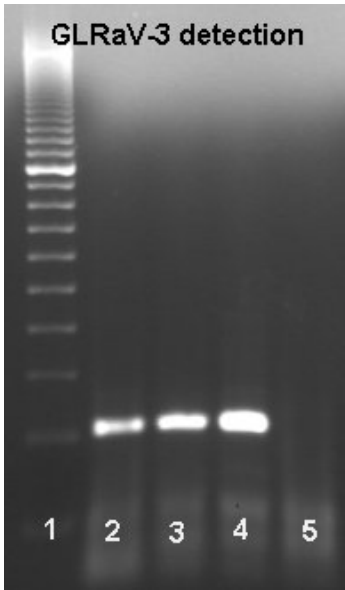
### 1.3 Australian National Nuclear Grapevine Collection

Genetic resource collections are considered unsatisfactory sites to hold virus-tested clones. Most countries also have nuclear collections of elite clones held for distribution in vine improvement schemes. These contain a much smaller number of clones, which must be certified free of important viruses by biological indexing before they can be held in the collection. A project was commenced by SARDI in 2000 to select clones for the establishment of a national nuclear grapevine collection for Australia (Nicholas 2006b, Nicholas 2006c). This work was funded by the Grape and Wine Research and Development Corporation.

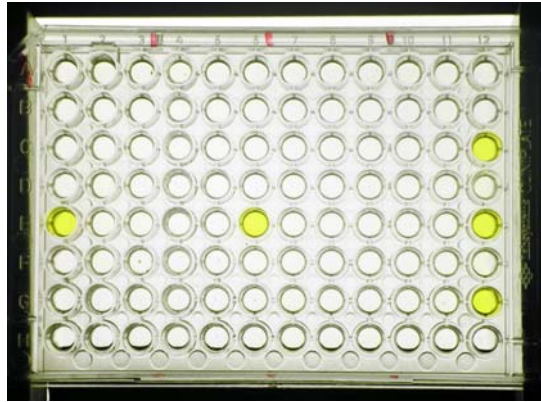
Over 300 candidate clones for the nuclear collection were initially selected in close consultation with the Australian Vine Improvement Association from existing clones in vine improvement schemes and other clones considered potentially useful from their known performance in trials. For each candidate, a vine was selected from the genetic resource collections held by SARDI at Nuriootpa in South Australia, Department of Primary Industries at Irymple and CSIRO at Merbein in Victoria. Cuttings of the candidate were taken from this vine for the clone to undergo sanitary selection. This has involved rapid screening of the clones for viruses using both RT-PCR (Figure 1) and ELISA (Figure 2) laboratory methods and the remaining ones have then been biologically indexed (Figure 3 and Figure 4). The laboratory methods and indicators used are given in Table 1. Results from all three methods are complementary and their combined use provides a more reliable indication of virus status.

**Table 1 Virus detection methods and indexing indicators used for sanitary selection of elite clones for the Australian National Nuclear Grapevine Collection**

Virus diseases	RT-PCR tests for pathogen	ELISA tests for pathogen	Biological indexing indicator
<b>Leafroll</b>			
Grapevine leafroll	GLRaV-1, GLRaV-2, GLRaV-3, GLRaV-4, GLRaV-5, GLRaV-9, GRSLaV	GLRaV-1, GLRaV-3	Cabernet Franc
<b>Rugose wood complex</b>			
Rupestris stem pitting	RSPaV		Rupestris St George
Kober stem grooving	GVA	GVA	5BB Kober
Grapevine corky-bark	GVB		LN33
LN33 stem grooving			LN33
<b>Fleck</b>			
Grapevine fleck virus	GFkV-A, GFkV-B	GFkV	Rupestris St George
<b>Fanleaf</b>			
Grapevine fanleaf virus	GFLV		Rupestris St George



**Figure 1** RT-PCR test showing in lane 1 DNA ruler, lanes 2 and 3 Grapevine leafroll-associated virus 3 positive samples, lane 4 positive control and lane 5 negative control – supplied by N Habili, Waite Diagnostics.



**Figure 2** ELISA plate showing the positive reaction to Grapevine leafroll-associated virus 3 in yellow (5 of the 96 samples tested positive) – supplied by N Habili, Waite Diagnostics.



**Figure 3** Biological indexing test vine showing leafroll virus symptoms, which develop after inoculation of Cabernet Franc with a clone which has leafroll virus.



**Figure 4** Biological indexing test showing Kober stem grooving symptoms, which develop after inoculation of 5BB Kober with a clone which has Grapevine virus A (GVA) seen after removal of bark.

Biological indexing involves grafting candidates and indicators together and the resultant vines are then grown for several years in the field to observe any virus symptoms i.e. indexing detects the disease rather than the associated virus. Indexing with woody indicators was used prior to the availability of laboratory methods. The early indexing work in Victoria was reported by Shanmuganathan and Fletcher (1980) and in South Australia (SARDI) by Cirami *et al.* (1988). Subsequent indexing in Australia was continued by G. Fletcher and by L. Krake from CSIRO (Krake *et al.* 1999). The biological indexing program for this project began in year 2000 and both G. Fletcher and L. Krake were initially closely involved. SARDI has established a virus reference collection of vines with specific viruses at Loxton as has been done in Europe (Greif and Walter 1997). Each year that vines have been grafted for indexing at Loxton, positive control vines (i.e. vines with known viruses grafted to indicators) have been established for comparison with candidates to assist in identification of symptoms.

The Australian Vine Improvement Association has recognised the unique quality of this material and established the Australian National Nuclear Grapevine Collection of about 200 of these elite clones in 2004 in virgin land at the NSW DPI Research Station at Dareton (Kerridge 2005). Indexing in the GWRDC project was completed in June 2006, but indexing of additional clones is continuing.

The nuclear collection is being managed under industry agreed protocols. The vines have been checked by ampelographer George Kerridge for trueness to type. All vines will be periodically laboratory tested and checked visually to ensure that they remain free of viruses. The clones will be made available to vine improvement groups in Australia provided that it can be ensured that their continued integrity and future health status is not compromised.

The longer term benefits arising from the project will be that vineyards planted with propagation material sourced through vine improvement schemes will have superior health status and not be subject to the detrimental effects of virus infections, which include reduced graft take and rooting in the nursery, progressive decline of vines, reduced yield and quality of grapes and reduced longevity of plantings.

## 1.4 Names, abbreviations and codes used

### 1.4.1 Names and abbreviations

AVIA	Australian Vine Improvement Association
Bord	Bordeaux, France
Bourgogne	Burgandy, France
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CW	Coonawarra, South Australia
DPI Victoria	Department of Primary Industries, Victoria
ENTAV	Etablissement National Technique pour l'Amelioration de la Viticulture, France
FSAC	Fragmented shoot apex culture
FPS	Foundation Plant Services, University of California, Davis
Gm	Geisenheim, Germany
GW	Great Western, Victoria
HT	Heat treatment for virus elimination
INRA	Institut National de la Recherche Agronomique, France
Irymple	Irymple, Victoria
LC	Langhorne Creek, South Australia
Loxton	SARDI Research Centre, Loxton, South Australia
Merbein	CSIRO Merbein, Victoria
Nuriootpa	SARDI Research Centre, Nuriootpa, South Australia
Rutherglen	Rutherglen, Victoria
SAVII	South Australian Vine Improvement Inc
SARDI	South Australian Research and Development Institute
Sidney	Centre for Plant Health, Sidney, British Columbia
UC Davis	University of California, Davis
Vassal	Genetic resource collection in France near Montpellier
USDA	United States Department of Agriculture

### 1.4.2 Accession number codes

Code number previously given by the Department of Primary Industry and Energy (DPI&E) to each import, Australian selection, or Australian bred grapevine.

#### ***Group 1***

A	Australian or local
I	Imported

#### ***Group 2***

C	Commonwealth (CSIRO)
N	New South Wales
Q	Queensland
S	South Australia
T	Tasmania
V	Victoria
W	Western Australia

#### ***Group 3***

e.g. 69 = Year of introduction or establishment as virus tested.

#### **Group 4**

Serial Numbers. These were used serially for the state concerned.

0001 – 1999	New South Wales
2001 – 3999	Victoria
4001 – 4999	Queensland
5001 – 5999	South Australia
6001 – 6999	Western Australia
7001 – 7999	Tasmania
8001 – 8999	CSIRO
9001 – 9999	Other Commonwealth Departments including DPI&E

Once a serial number is given this is retained at all times by the clone irrespective of transfers.

#### **1.4.3 Availability codes**

##### **New South Wales (Code N)**

Murrumbidgee Irrigation Area Vine Improvement Society (MIAVIS)

PO Box 167, Yenda NSW 2681

Ph: (02) 6968 1202 Fax: (02) 6968 1479

##### **Queensland (Code Q)**

Queensland Vine Improvement Association (QVIA)

OP Box 60, Ballandean QLD 4382

Ph: (07) 4684 1310 Fax: (07) 4684 1147

##### **South Australia (Code S)**

Riverland Vine Improvement Committee (RVIC)

PO Box 292, Monash SA 5342

Ph: (08) 8583 5366 Fax: (08) 8583 5504

(this vine improvement group in SA can supply most of the available clones).

##### **Victoria (Code V)**

Victorian and Murray Valley Vine Improvement Association (VAMVIA)

P.O. Box 460, Irymple Victoria 3498

Ph: (03) 5022 8499 Fax: (03) 5021 4833

##### **Western Australia (Code W)**

Western Australia Vine Improvement Association (WAVIA)

PO Box 941 Margaret River WA 6285

Ph: (08) 9755 2030 Fax: (08) 9755 2030

## 2. Winegrape varieties and clones

### 2.1 Aglianico

Red variety from southern Italy.

Clone	Accession	Source	Comments	Available
FPS 01		California	Imported by AVIA.	V

### 2.2 Albana

White variety from Emilia Romagna region in Italy.

Clone	Accession	Source	Comments	Available
FSAC*			FSAC treatment by CSIRO.	

### 2.3 Albarino

White variety from Spain and Portugal.

Clone	Accession	Source	Comments	Available
Galicia	IC898565	Spain	Imported from Galicia.	Q, V
SAVII 01				S

### 2.4 Arneis

White variety from Piedmont region in Italy.

Clone	Accession	Source	Comments	Available
CVT CN 15*	IS895552	Italy	Imported from Torino.	N, S
CVT CN 19*	IS895553	Italy	Imported from Torino.	N, S

### 2.5 Barbera

Red variety from Piedmont region in Italy.

Clone	Accession	Source	Comments	Available
F6V4*	IV662142	California	FPS 01, now distributed in California as FPS 06.	N, V, W
AT 84*		Italy	Imported from Torino by SARDI, also imported as IC888556.	N, S
CVT AT 424*		Italy	Imported from Torino by SARDI.	N, S, V
SAVII 01				S

### 2.6 Cabernet Franc

Red variety from Bordeaux and the Loire Valley in France.

Clone	Accession	Source	Comments	Available
C7V15*	IV702233	California	FPS 01. Originally from Montpellier, France.	S, V
C7V15 FSAC*		California	C7V15 put through FSAC by DPI Victoria.	V
E7V10	IV752409	California	Originally from Jackson Experiment Station.	
1334 Bord*	AN720181	France	Heat-treated in NSW.	N, S
C24-1*	AC728186	France	Also known as Penfold 58, imported by Penfolds.	S, V

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

## 2.7 Cabernet Sauvignon

Red variety from the Bordeaux region in France.

Further reading: Whiting and Hardie (1981), McCarthy and Ewart (1988) and Cirami *et al.* (1993).

Clone	Accession	Source	Comments	Available
125 FSAC*		Australia	Clone 125 put through FSAC by DPI Victoria. Original clone 125, AS702351 has leafroll 9 and GVA viruses (Habibi and Rowhani 2002). It came from SARDI trial at Nuriootpa harvested 1973-1976.	V
126*	AS702259	Australia	From SARDI trial at Nuriootpa harvested 1973-1976.	Q, V
CW44*	AS805400	Australia	From SARDI trial at Coonawarra harvested 1984-1988, also in later S, V, W SARDI trials at Langhorne Creek and McLaren Vale.	
GW		Australia	Selection from Great Western.	V
LC1		Australia	From SARDI trial at Langhorne Creek harvested 1977-1980.	N
LC7		Australia	From SARDI trial at Langhorne Creek harvested 1977-1980.	N, S
LC9*		Australia	From SARDI trial at Langhorne Creek harvested 1977-1980.	S
LC10*		Australia	From SARDI trial at Langhorne Creek harvested 1977-1980.	N, S
LC14*		Australia	From SARDI trial at Langhorne Creek harvested 1977-1980.	N, S
LC84*		Australia	From SARDI trial at Langhorne Creek harvested 1977-1980.	N, S
LCR2V11*		Australia	From SARDI trial at Langhorne Creek harvested 1977-1980, but came originally from the Clare Valley.	N, S
R3V19E*		Australia	Selection from Coonawarra.	V
R3V19E FSAC*		Australia	Clone R3V19E put through FSAC by DPI Victoria.	V
Q390-05*		Canada	Imported from Sidney. Originally from France.	S
C7V5	IV642092	California	FPS 02. Originally from Oakville, California.	
G9V3	IV692217	California	FPS 07. Originally from Concannon, California.	N, Q, S, V, W
G9V3 FSAC CSIRO*		California	Clone G9V3 put through FSAC by CSIRO.	
G9V3 FSAC DPIV*		California	Clone G9V3 put through FSAC by DPI Victoria.	V
FPS 12*	IS915612	California	K13V6. Originally from Chile.	S

## 2.8 Canada Muscat

White vinifera-labrusca hybrid (Muscat Hamburg x Hubbard) from Vineland Station, Ontario Canada.

Clone	Accession	Source	Comments	Available
Vineland*	IC708152	Canada		S

## 2.9 Carmenere

Red variety from Bordeaux region in France and now widely planted in Chile.

Clone	Accession	Source	Comments	Available
SAVII 01				S

## 2.10 Chambourcin

Red hybrid variety produced in France resistant to mildew diseases and phylloxera, vinifera-like character.

Clone	Accession	Source	Comments	Available
Q106-35B*	IC738218	Canada	Imported from Sidney.	N, S, V

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.



## 2.11 Chardonnay

White variety from the Burgundy and Champagne regions of France.

Clones from California originated from selections made by L. Martini from a California vineyard, which were further selected by H. Olmo. FPS 05 is one of the most widely planted clones in California (Bettiga *et al.* 2003). FPS 06, FPS 07 and FPS 08 are from one Olmo selection, with different lengths of heat treatment.

Descriptions of the French clones can be found in Boidron *et al.* (1995). Clones 76, 95, 96 were selected by R. Bernard and co-workers in Burgundy for table wine production (Bernard 1986). There are French clones (77 and 809), which have slight muscat character.

Further reading: McCarthy (1988b), Cirami (1993a), Ewart *et al.* (1994), Caldwell (2002) and Whiting (2003).

Clone	Accession	Source	Comments	Available
G9V7*	IV712306	California	FPS 05.	N, Q, S, V, W
G9V7 FSAC		California	Clone G9V7 put through FSAC by DPI Victoria.	V
I10V1*	IC698127	California	FPS 06.	S, V
I10V3 *	IC698128	California	FPS 07.	N, S, V, W
I10V5	IC698129	California	FPS 08.	N, S, V, W
I10V5 FSAC*		California	Clone I10V5 put through FSAC by DPI Victoria.	V
FPS 15		California	Prosser selection. SAVII 17.	
Q233-03*		Canada	Imported by SARDI from Sidney in 1992. SAVII 05.	N, Q, S
Q390-09*		Canada	Imported by SARDI from Sidney in 1992. SAVII 07.	N, Q, S
Q661-04*		Canada	Imported by SARDI from Sidney in 1992. SAVII 06.	N, S
Q949-03		Canada	Imported by SARDI from Sidney in 1992. Reported to be French clone 76. SAVII 01.	N, S
Q949-08		Canada	Imported by SARDI from Sidney in 1992. Reported to be French clone 277. SAVII 04.	N, S
76*	IC888544.	France	Reported to be French clone 76.	V
76 FSAC		France	Clone 76 put through FSAC by CSIRO.	
78		France	Reported to be French clone 78. SAVII 09.	S
84	IN700180	France	Tested positive for fleck virus.	S
95*	IC888545	France	Reported to be French clone 95. SAVII 02.	N, S, V
95 FSAC		France	Clone 95 put through FSAC by CSIRO.	
96	IC888546	France	Reported to be French clone 96. SAVII 03.	N, S
96 FSAC		France	Clone 96 put through FSAC by CSIRO.	
118		France	Imported to Tasmania. Reported to be French clone 118.	
121		France	Reported to be French clone 121. SAVII 10.	S
124		France	Imported to Tasmania. Reported to be French clone 124.	
125		France	Reported to be French clone 125. SAVII 08.	S
131		France	Reported to be French clone 131. SAVII 16.	
277 FSAC		France	Clone 277 IC888547 put through FSAC by CSIRO. Original tested positive for fleck virus.	
352		France	Imported to Tasmania. Reported to be French clone 352.	
415		France	Imported to Tasmania. Reported to be French clone 415.	
548		France	Reported to be French clone 548. SAVII 15.	

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

## 2.12 Chenin Blanc

White variety from the Loire Valley in France.

Clone	Accession	Source	Comments	Available
C4V16*	IV622050	California	FPS 01.	N, S, W
C4V16 FSAC*		California	Clone C4V16 put through FSAC by DPI Victoria.	V
F6V13	IV712308	California	FPS 04.	N, V
Stellenbosch	IV712356	South Africa	Tested positive for fleck virus.	S

## 2.13 Colombard

White variety from the Cognac area in France.

Clone	Accession	Source	Comments	Available
F13V7*	IV672168	California	FPS 01. Originally from California vineyard.	V
F13V7 FSAC*		California	Clone F13V7 put through FSAC by DPI Victoria.	V
F13V8*	IC688031	California	FPS 02. Not now held by FPS, but available through the California nursery industry.	N, Q, S, V
G3V1*	IV712310	California	FPS 03. Originally from Botany Dept, UC Davis.	N, S, V

## 2.14 Dolcetto

Red variety from the Piedmont region in Italy.

Clone	Accession	Source	Comments	Available
1034/1-1*		Australia	SGW 1-1-392. Selected in Great Western.	V
GW 183		Australia	BGW 0539 1-1-183. Selected in Great Western.	V
CN 69*	IS895557	Italy	Imported from Torino. Most propagated clone in Piedmont.	N, S
CVT AL 275*	IS895556	Italy	Imported from Torino.	N, S, V

## 2.15 Dornfelder

Red variety bred in Germany.

Clone	Accession	Source	Comments	Available
Q1043-04		Canada	Imported from Sidney.	S

## 2.16 Durif

Red variety from the south of France

Clone	Accession	Source	Comments	Available
C12V3	IV712320	California	FPS 03 (Petit Sirah). Originally from a California vineyard.	
H7V13*	IC698089	California	FPS 05 (Petite Sirah). Not now held by FPS.	N, S

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

## 2.17 Fiano

White variety from southern Italy.

Clone	Accession	Source	Comments	Available
FSAC*			IC788456 put through FSAC by CSIRO.	

## 2.18 Gamay

Red variety from Beaujolais in France.

Clone	Accession	Source	Comments	Available
BGW19 FSAC*		Australia	Clone BGW19 put through FSAC by DPI Victoria (original BGW19 tested positive for GVA virus).	
RVC 12			From Rutherglen	V
RVC 12 FSAC*		Australia	Clone RVC 12 put through FSAC by DPI Victoria.	V
222	IC888552	France	Reported to be French clone 222.	V
284*	IC798307	France	Reported to be French clone 284.	V
Beauj. H200A*	AN720309	France	Heat-treated in NSW.	

## 2.19 Graciano

Red Spanish variety (known as Morrastel in southern France).

Clone	Accession	Source	Comments	Available
WA6V6 FSAC*		California	Clone WA6V6 was imported as Xeres from FPS. Original clone WA6V6 tested positive for leafroll 3 virus and was put through FSAC by DPI Victoria.	V
SAVII 01				S

## 2.20 Grenache

Red variety from Spain also grown in southern France.

Clone	Accession	Source	Comments	Available
38*		Australia	From SARDI trial at Nuriootpa harvested 1978-1981.	Q, S
1-248 FSAC*		Australia	Clone 1-248 put through FSAC by DPI Victoria.	V

## 2.21 Lagrein

Red variety from Trentino region in northern Italy.

Clone	Accession	Source	Comments	Available
H9V7*	IC698094	California	FPS 01 Not now held by FPS.	N, S, V
H9V9*	IC698095	California	FPS 02. Originally from Experimental Station at Jackson.	N, S, V

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

## 2.22 Malbec

Red variety from south-west France

Clone	Accession	Source	Comments	Available
Kalimna 1*		Australia	From SARDI trial at Nuriootpa harvested 1981-1987.	S
Kalimna 2		Australia	From SARDI trial at Nuriootpa harvested 1981-1987.	S
Kalimna 3		Australia	From SARDI trial at Nuriootpa harvested 1981-1987.	S
WA		Australia		S
E2V2*	IV712313	California	FPS 03. Not now held by FPS.	V
E2V3	IV702238	California	FPS 04. Originally from Bordeaux. Prone to poor set and low yields.	S
C6V11*	IV712314	California	FPS 06. Prone to poor set and low yields.	
1056	IC698125	France	French clone 46 is INRA 1056 from Bordeaux.	N
1056 HT162*		France	1056 heat-treated in SA.	
1056 FSAC*		France	1056 put through FSAC by DPI Victoria.	V

## 2.23 Marsanne

White variety from the Rhone Valley in France.

Clone	Accession	Source	Comments	Available
Rutherglen		Australia		
E8V1	IC688036	California		

## 2.24 Mataro

Red variety from Spain and also grown in Provence in France, where it is known as Mourvedre.

Clone	Accession	Source	Comments	Available
R2V7*	AV712339	Australia	From DPI Victoria.	S
R2V13*	AV712338	Australia	From DPI Victoria.	N, S
F6V14	IC688037	California	FPS 02. Not now held by FPS.	

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

## 2.25 Merlot

Red variety from Bordeaux in France.  
Further reading Whiting (2003).

Clone	Accession	Source	Comments	Available
RVC 13*		Australia	From Rutherglen, Victoria.	V
Q45-14*	IS905613	Canada	Imported from Sidney, originally from Italy.	N, S
D3V14	IV642093 IC658013	California	FPS 01. Originally from California vineyard Inglenook, not heat-treated. Also imported from FPS to SA as IS672093. Tested positive for fleck virus.	N, Q, S, V, W
D3V14 FSAC		California	Clone D3V14 put through FSAC by CSIRO.	
D3V5	IV712315	California	FPS 02	N, S, W
D3V7*	IS762408	California	FPS 03. Originally from California vineyard Inglenook. Is a standard clone used in California due to consistency of set, yield and composition (Bettiga <i>et al.</i> 2003).	N, S, V, W
FPS 06	IS915614	California	Originally from California Monte Rosso vineyard, has been heat-treated.	S
FPS 08*	IS915615	California	Originally from Argentina. Lower yield due to poor set, especially in cool weather (Bettiga <i>et al.</i> 2003).	S
FPS18		California	Bear Flats clone from Sterling Winery. Imported by AVIA.	V
SAVII 02		Italy		S

## 2.26 Meunier

Red variety, a mutant of Pinot Noir, used in Champagne in France.

Clone	Accession	Source	Comments	Available
H10V5*	IC698099	California	FPS 01. Reported to be French clone 817.	S

## 2.27 Mondeuse

Red variety from eastern France.

Clone	Accession	Source	Comments	Available
F3V16	IC688038	California	FPS 01A (Refosco).	N, Q, S

## 2.28 Montepulciano

Red variety from central Italy.

Clone	Accession	Source	Comments	Available
FSAC*		Italy	Clone put through FSAC by CSIRO.	
SAVII 01		Italy		S

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

## 2.29 Muscadelle

White variety from Bordeaux in France.

Further reading: McCarthy *et al.* (1989).

Clone	Accession	Source	Comments	Available
32 HT*		Australia	Heat-treated by SARDI.	S
C1V15	IV622055	California	FPS 01. Sauvignon Vert.	

## 2.30 Muscat Blanc

White variety from France known as Muscat a petits grains blanc. Syn. in Australia is White Frontignac.

Clone	Accession	Source	Comments	Available
73-7*		Australia	From SARDI trial at Nuriootpa harvested 1978-1981.	S
F3V14*	IS752221	California	FPS 01. Has tight bunches.	S

## 2.31 Nebbiolo

Red variety from Piedmont region in Italy.

Clone	Accession	Source	Comments	Available
K6V1*	IC748242	California	FPS 01. Unusually fertile when spur pruned, large crop of light coloured fruit.	N, Q, V, W
FPS 10		California	Originally from Torino. Imported by AVIA. Lampia biotype.	V
CVT CN 111	IS895554	Italy	Imported from Torino. Rose biotype. Tested positive for fleck virus.	N, S, V
CVT CN 230*	IS895555	Italy	FPS 04. Imported from Torino. Lampia biotype.	N, S
SAVII 03		Italy		S

## 2.32 Orange Muscat

White variety known in France as Muscat Fleur d'Oranger.

Clone	Accession	Source	Comments	Available
C13V1*		California	FPS 01A.	S, V

## 2.33 Petit Verdot

Red variety from Bordeaux in France.

Clone	Accession	Source	Comments	Available
G7V1*	IV752410	California	Originally from Jackson vineyard.	N, Q, S, V

## 2.34 Pinotage

Red variety bred in South Africa in 1925 (Pinot Noir x Cinsaut).

Clone	Accession	Source	Comments	Available
FPS 01		California	FPS obtained from New Zealand. Imported by AVIA.	V
SAVII 01				S

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

### 2.35 Pinot Blanc

Mutation of Pinot Noir with white berries found in Burgundy, France in the late nineteenth century. Two clones have been certified in France – 54 and 55.

Further reading: Galet (1998).

Clone	Accession	Source	Comments	Available
54*	IC798310	France	Reported to be French clone 54.	S

### 2.36 Pinot Gris

Mutation of Pinot Noir with grey berries, which was first recorded in the fourteenth century. It produces an aromatic white wine. Syn. Pinot Grigio in Italy.

Clone	Accession	Source	Comments	Available
D1V7*	IV642097	California	FPS 01A Originally from Alsace.	N, S
SAVII 02				S

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

## 2.37 Pinot Noir

Long cultivated red variety recorded in the first century, grown in Burgundy and Champagne in France. There is a large variation in Pinot Noir clones and various groups of clones exist: standard quality (Pinot fin), highly fruitful (Pinot fructifier), upright shoots (Pinot droit) and loose bunches (Mariafeld).

Further reading: Ewart and Sitters (1987), McCarthy (1988b), Ewart and Sitters (1989), Whiting and Hardie (1990), Bettiga *et al.* (2003), Farquhar (2003) and Whiting (2003).

Clone	Accession	Source	Comments	Available
MV6	AV712340	Australia	Selected from old vines in the Hunter Valley. Tested positive for fleck virus. Low yielding, lower bunch weight, good fruit character (Whiting 2003). Also heat-treated in NSW (H170A).	N, S
MV6 FSAC*		Australia	MV6 put through FSAC by DPI Victoria.	V
Q390-02		Canada	Imported from Sidney, originally from France.	
D2V5	IC698104	California	FPS 01A. Selection B111 from Wadensvil, Switzerland. Wines lack richness (Whiting 2003).	S, V
D2V5 FSAC*		California	D2V5 put through FSAC by DPI Victoria.	V
D2V6*	IV712222	California	FPS 02A Selection B110-16 from Wadensvil, Switzerland. Put through FSAC by DPI Victoria. Clone G5V15 is also FPS 02A.	S, V
D4V2		California	FPS 04. Selection from Pommard, in Burgundy France, small bunches.	
F6V7	IV712322	California	FPS 12. Beba clone, from Spain, Pinot fin type, small bunches, moderate yield.	V
G8V3	IV712323	California	FPS 13. Originally from Martini vineyard, widely planted in California.	S, V
G8V7*	IV712324	California	FPS 15. Originally from Martini vineyard.	S, V
D5V12A*	IV622051	California	FPS 19. Formerly known as Gamay Beaujolais in California, but it is not the variety Gamay from Beaujolais. It is Pinot droit type – has upright shoots, larger bunches and higher yields, later maturity and produces lighter style wines than Pinot fin clones.	S, V, W
H7V15*	IV712325	California	FPS 22. Similar type to FPS 19.	S, V
114	IC888418	France	Pinot fin type, quality clone in France.	N, S, V
114 FSAC		France	Clone 114 put through FSAC by CSIRO.	
115	IC888419	France	Pinot fin type, quality clone in France. Tested positive for fleck virus.	N, S, V
115 FSAC		France	Clone 115 put through FSAC by CSIRO.	
236	IC898550	France	Highly productive clone in France.	
375	IC888543	France	Highly productive clone in France. CSIRO also put through FSAC.	
386	IC888548	France	Productive clone in France.	V
521	IC898549	France	Used for sparkling wine production in France.	V
777	IC898551	France	Below average production, quality clone in France. Tested positive for fleck virus.	N, S, V
18 Gm*	IN690013.	Germany	Selection from Geisenheim. High yielding (Whiting 2003).	S, V
Bourgogne H140A	AN710300,	Switzerland	Swiss selection, but originating from Burgundy. Heat-treated in NSW 140 days.	V
Bourgogne H170B	AN720319	Switzerland	From same clone as H140A, but heat-treated 170 days.	V
Cortailod*		Switzerland	Swiss selection, reported to be early maturing in Switzerland. Imported in 1969 and heat-treated in NSW.	
Mariafeld*	IN690014	Switzerland	Swiss selection from Wadenswil. Has loose bunches. High yielding, larger berries (Whiting 2003). Later maturing in Switzerland.	N, S, V
Oberlin H120B	AN720302	Switzerland	Swiss selection, but originating from Colmar. Heat-treated in NSW 120 days.	V
Oberlin HRV5		Switzerland		V

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.



## 2.38 Primitivo

It has been shown by DNA tests at University of California, Davis that the red varieties Primitivo and Zinfandel are actually both clones of the Croatian variety Crljenak Kastelanski.

Clone	Accession	Source	Comments	Available
SAVII 01		Italy		S

## 2.39 Riesling

White variety from the Rhine Valley in Germany.

Further reading: Cirami *et al.* (1985), Cirami *et al.* (1988), Ewart and Sitters (1988), McCarthy (1988) and Whiting (2003).

Clone	Accession	Source	Comments	Available
156*		Australia	From SARDI trial at Loxton harvested 1972-1978.	S
D2V2*	IC688051	California	FPS 02. Gm 198 from Geisenheim, Germany via Oregon State University. Also imported directly from Geisenheim as IN690011.	S
D2V3*	IC688052	California	FPS 03. Originally from Geisenheim – clone 110.	N, S, V
F8V13 FSAC		California	FPS 09. F8V13 IV712331 put through FSAC by DPI Victoria.	V
G9V15*	IV712332	California	FPS 10. Selection by Martini, which has been heat-treated.	S, V
I10V14*	IV712333	California	FPS 11. Steinberg clone from Neustadt, Germany.	S
I10V15*	IV712334	California	FPS 12. Clone 90 from Neustadt, Germany.	S
810 Colmar H160A*	AN720198	France	Imported from Colmar, Alsace, heat-treated in NSW.	
812 Colmar*	IN720316	France	Imported from Colmar, Alsace.	
813 Colmar*	IN720315	France	Imported from Colmar, Alsace. French clone 49 is INRA-CV 813.	N
110-18		Germany	Imported by CSIRO from Geisenheim. Held by AVIA.	V
198 Gm	IN690011	Germany	Imported from Geisenheim.	N
198-25		Germany	Imported by CSIRO from Geisenheim. Held by AVIA.	
237 Gm*	IN680192	Germany	Imported from Geisenheim.	
239 Gm	IN690012	Germany	Imported from Geisenheim.	N, S, V
239-25		Germany	Imported from Geisenheim. Held by AVIA.	
68 Trier*	IN720314	Germany	Imported from Trier, selected at Bernkastel.	N
356 Trier*	IN690311	Germany	Imported from Trier, selected at Bad Kreuznach.	N
E37 Trier*	IN720313	Germany	Imported from Trier.	N
K34 Trier H200B	AS900320	Germany	Imported from Trier.	

## 2.40 Riesling Italico

White variety from North-East Italy unrelated to Riesling

Clone	Accession	Source	Comments	Available
H7V5	IC698106	California		S
Merbein	IC858437	Italy		S

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

## 2.41 Roussane

White variety from the Rhone Valley in France.

Clone	Accession	Source	Comments	Available
Vassal*	IC748289	France		S, V
SAVII 01				S

## 2.42 Rubired

Red variety bred in California (Alicante Ganzin x Tinta Cao).

Clone	Accession	Source	Comments	Available
C5V14*	IV632068	California	FPS 02.	S

## 2.43 Ruby Cabernet

Red variety bred in California (Carignan x Cabernet Sauvignon).

Clone	Accession	Source	Comments	Available
E5V4*	IC688053	California	FPS 01.	N, S
E5V4 FSAC*		California	E5V4 put through FSAC by DPI Victoria.	V
G2V2	IV752422	California		V

## 2.44 Sangiovese

Red variety from Tuscany in Italy.

Clone	Accession	Source	Comments	Available
H6V9*	IC698109	California	FPS 01.	N, S, V
SAVII 03		Italy		S
SAVII 04		Italy		S
SAVII 05		Italy		S

## 2.45 Saperavi

Red variety from Russia.

Clone	Accession	Source	Comments	Available
I11V10*	IC748246	California	FPS 01 (not now held by FPS).	S, V

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

## 2.46 Sauvignon Blanc

White variety from southwest France.

Further reading: Cirami (1993b), Ewart *et al.* (1993) and Ewart *et al.* (1994).

Clone	Accession	Source	Comments	Available
F4V6	IV752413	California	FPS 01. From California vineyard.	S, W
I4V9*	IV752414	California	FPS 02 (not now held by FPS).	S, W
H5V10*	IC698110	California		S, V, W
H5V10 FSAC*		California	Clone H5V10 put through FSAC by DPI Victoria.	V
F7V7*	IS913105	California		S, V
Q97-20C	IC868402	California		S, V
5385 Bord H231A*	AN710178	France	Heat-treated in NSW.	N, S
SAVII 59		France		S

## 2.47 Semillon

White variety from Bordeaux in France.

Further reading: Cirami *et al.* (1985) and Ewart *et al.* (1994).

Clone	Accession	Source	Comments	Available
14*		Australia	From SARDI trial at Nuriootpa harvested 1973-1978.	S, V
32*	AS735379	Australia	From SARDI trial at Nuriootpa harvested 1973-1978.	N, S
82*		Australia	From SARDI trial at Barmera harvested 1981-1983.	S
143*	AS702354	Australia	From SARDI trial at Barmera harvested 1981-1983.	S
147		Australia	From SARDI trial at Barmera harvested 1981-1983.	N, S
DA16162*		Australia	Selection from the Hunter Valley.	N, S, V
TO9081*		Australia	Selection from the Hunter Valley.	N, S
D10V12*	IV642100	California	FPS 05.	N, V, W
D10V12 FSAC*		California	Clone D10V12 put through FSAC by DPI Victoria.	V
F4V1*	IV642099	California	FPS 07.	V
I11V14*	IS782327	California	FPS 08.	S
3049*	IN690305	France	Heat-treated in NSW.	

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

## 2.48 Shiraz

Red variety from the Rhone valley in France, where it is known as Syrah.

SARDI clones came from a trial at Nuriootpa of selections from the Barossa, Langhorne Creek and McLaren Vale harvested from 1993-1994. Further selections were later made from these clones from berry weight, maturity and colour data. There is limited availability of these clones from AVIA and SARDI at Nuriootpa.

Clone	Accession	Source	Comments	Available
373*		Australia	From SARDI trial at Loxton harvested 1972-78.	
712*	AS702272	Australia	From SARDI trial at Loxton harvested 1972-78.	S
1125		Australia	From SARDI trial at Loxton harvested 1972-78. Tested positive for fleck virus.	S
1127	AS702274	Australia	From SARDI trial at Loxton harvested 1972-78.	N, S
1654*	AS702271	Australia	From SARDI trial at Loxton harvested 1972-78.	N, Q, S, W
2412	AS702273	Australia	From SARDI trial at Loxton harvested 1972-78.	
2626*	AS702275	Australia	From SARDI trial at Loxton harvested 1972-78.	S
12*		Australia	From SARDI trial at Nuriootpa harvested 1978-86.	N, Q, S
30*		Australia	From SARDI trial at Nuriootpa harvested 1978-86.	N, Q, S, V
ESA3021*		Australia	Selection from the Hunter Valley.	N, V
PT10	AN610018	Australia	From pruning trial at Griffith.	N, V
PT15	AN610019	Australia	From pruning trial at Griffith.	N, Q, S, W
PT23	AN610020	Australia	From pruning trial at Griffith.	N, Q, V
PT23 FSAC*		Australia	Clone PT23 put through FSAC by DPI Victoria.	V
R6V28W*		Australia	Selected from old vines at Chateau Tahbilk, Victoria.	S, V
SARDI 1		Australia		
SARDI 3*		Australia		
SARDI 4*		Australia		
SARDI 6*		Australia		
SARDI 7*		Australia		
SARDI 8*		Australia		
SARDI 9*		Australia		
SARDI 10*		Australia		

## 2.49 Tannat

Red variety from south-west France

Clone	Accession	Source	Comments	Available
H9V3*	IC698115	California		N, Q, S, V

## 2.50 Tarrango

Red variety bred by CSIRO.

Clone	Accession	Source	Comments	Available
MH47-40	AC758261	Australia		N, S

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

## 2.51 Tempranillo

Red variety from Spain.

Clone	Accession	Source	Comments	Available
D8V12	IV712330	California	Tested positive for leafroll 5 virus.	N, S
D8V13*	IC668019	California		N, S

## 2.52 Tinta Molle

Red variety from Portugal used for making port wine.

Clone	Accession	Source	Comments	Available
F2V14*	IV662147	California	FPS 01 (syn. Tinta Madeira).	S

## 2.53 Touriga

Red variety from Portugal used for making port wine.

Clone	Accession	Source	Comments	Available
E6V12	IC698118	California	FPS 01.	Q, V

## 2.54 Traminer

White variety from Alsace, where it is known as Gewurztraminer.

Clone	Accession	Source	Comments	Available
C3V15*	IV622052	California	FPS 02 is reported to be INRA-CV 456.	S
H8V9*	IV712328	California	Originally from Jackson vineyard.	
456 Colmar	IN690016	France	French clone 47 is INRA-CV 456.	
457 Colmar*	IN690017	France	French clone 48 is INRA-CV 457.	

## 2.55 Verdelho

White variety from Portugal.

Clone	Accession	Source	Comments	Available
Kosovich*		Australia	Western Australian selection in a SARDI trial at Nuriootpa harvested from 1995-1997.	N, S, V
WA 4*		Australia	Western Australian selection in a SARDI trial at Nuriootpa harvested from 1995-1997.	S

## 2.56 Vermentino

White variety from Italy.

Clone	Accession	Source	Comments	Available
H62.1LN*	IC748245	California	Imported as Rolle.	S

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

## 2.57 Viognier

White variety from the Rhone Valley in France.

Clone	Accession	Source	Comments	Available
HTK			Heat-treated by CSIRO. Possibly has GVA virus.	N, Q, S, V
642*	IV953528	France	Reported to be French clone 642.	N, S, V

## 2.58 White Frontignac

See Muscat Blanc

## 2.59 Zinfandel

It has been shown by DNA tests at University of California, Davis that the red varieties Zinfandel and Primitivo are actually both clones of the Croatian variety Crljenak Kastelanski.

Clone	Accession	Source	Comments	Available
C11V7*	IV642101	California	FPS 01A.	S, V
F11V6	IC718185	California	FPS 06.	S, V

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

### 3. Table grape varieties and clones

#### 3.1 Autumn Black

Mid to late season black seeded tablegrape.

Clone	Accession	Source	Comments	Available
USDA		California	Bred by USDA, Fresno C74-1.	V

#### 3.2 Autumn Royal

Mid to late season black seedless tablegrape.

Clone	Accession	Source	Comments	Available
FPS 01		California	Bred by USDA, Fresno A97-68. Autumn Black cross. Imported by AVIA.	N, V

#### 3.3 Blush Seedless

Mid season red seedless tablegrape.

Clone	Accession	Source	Comments	Available
FPS 01	IW852958	California	Bred at UC Davis.	V

#### 3.4 Calmeria

Late season white seeded tablegrape.

Clone	Accession	Source	Comments	Available
B1V6		California		V
H64-1*		California		
K4V9	IV752419	California	FPS 02.	V

#### 3.5 Centennial Seedless

Early white seedless, Muscat flavoured, tablegrape.

Clone	Accession	Source	Comments	Available
FPS 01	IV862959	California	Bred at UC Davis.	V

#### 3.6 Christmas Rose

Late season red seeded tablegrape.

Clone	Accession	Source	Comments	Available
FPS 01	IW852960	California	Bred at UC Davis C15-47.	V

#### 3.7 Crimson Seedless

Mid to late season red seedless tablegrape.

Clone	Accession	Source	Comments	Available
USDA*	IS895560	California	Bred by USDA, Fresno.	Q, S, V

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

### 3.8 Dawn Seedless

Early white seedless tablegrape.

Clone	Accession	Source	Comments	Available
FPS 01	IV862961	California	Bred at UC Davis G4-36.	V, W

### 3.9 Fantasy Seedless

Mid season black seedless tablegrape.

Clone	Accession	Source	Comments	Available
USDA	IS895561	California	Bred by USDA, Fresno.	V

### 3.10 Flame Seedless

Early red seedless tablegrape.

Clone	Accession	Source	Comments	Available
K5V8*	IC748236	California	FPS 01. Bred by USDA, Fresno.	N, V

### 3.11 Muscat Hamburg

Mid season black seeded tablegrape.

Clone	Accession	Source	Comments	Available
Irymple*		Australia		
E3V8	IC688042	California		V

### 3.12 Red Globe

Mid season red seeded tablegrape.

Clone	Accession	Source	Comments	Available
FPS 01	IV862957	California	Bred at UC, Davis 10-23D. Tested positive for Grapevine rootstock stem lesion associated virus. Found incompatible with 5BB Kober, 5C Teleki, 3309 and 1103 Paulsen rootstocks in California (Uyemoto <i>et al.</i> 2001 and Golino 2003).	S, V

### 3.13 Ruby Seedless

Mid season red seedless tablegrape.

Clone	Accession	Source	Comments	Available
B13V15	IV692223	California	Bred at UC, Davis.	V

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.



## 4. Drying grape varieties and clones

### 4.1 Carina

Black seedless drying grape.

Clone	Accession	Source	Comments	Available
Merbein*	AC758259	Australia	Bred by CSIRO MM4-38.	S, V

### 4.2 Diamond Muscat

White muscat flavoured seedless drying grape.

Clone	Accession	Source	Comments	Available
FPS 01		California	Bred by USDA, Fresno. Imported by AVIA.	V

### 4.3 Dovine

White seedless drying grape.

Clone	Accession	Source	Comments	Available
FPS 01		California	Bred by USDA, Fresno. Imported by AVIA.	V

### 4.4 Fiesta

White seedless drying grape.

Clone	Accession	Source	Comments	Available
LH	IC748235	California	Bred by USDA, Fresno.	V

### 4.5 Merbein Seedless

White seedless drying grape.

Clone	Accession	Source	Comments	Available
Merbein	AC818350	Australia	Bred by CSIRO.	V

### 4.6 Muscat Gordo Blanco

White seeded variety from the Mediterranean area, syn. Muscat of Alexandria used for drying and as wine grape.

Clone	Accession	Source	Comments	Available
131	AS702268	Australia	From SARDI trial at Loxton harvested 1972-1978.	S
138*	AS702267	Australia	From SARDI trial at Loxton harvested 1972-1978.	
173*	AS702266	Australia	From SARDI trial at Loxton harvested 1972-1978.	S
LC3*		Australia	From SARDI trial at Barmera harvested 1991-1993 (originally selected at Langhorne Creek).	S
C6		Australia	Clone selected at Dareton, NSW.	N
E4		Australia	Clone selected at Dareton, NSW.	S
G5 HT230A		Australia	Clone selected at Dareton, NSW.	N, S
J2 HT170B		Australia	Clone selected at Dareton, NSW.	N, V
J2 HT199A		Australia	Clone selected at Dareton, NSW.	S

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

#### 4.7 Sultana

White seedless grape for drying and tablegrape production.

Clone	Accession	Source	Comments	Available
H4 FSAC		Australia	Original H4 AC708161 tested positive for leafroll 4 virus.	V
H5	AC708160	Australia	Tested positive for leafroll 4 virus.	S, V
H5 2-2-255	AC758265	Australia	Clone H5 heat-treated by CSIRO.	V
M12	AC708162	Australia	Tested positive for leafroll 4 virus.	S, V

#### 4.8 Summer Muscat

White seedless muscat flavoured drying grape.

Clone	Accession	Source	Comments	Available
FPS 01		California	Bred by USDA, Fresno. Imported by AVIA.	V

#### 4.9 Sunmuscat

White seedless muscat flavoured drying grape.

Clone	Accession	Source	Comments	Available
B4V11	IC748240	California	Bred by USDA, Fresno 58-93. CSIRO joint development with USDA.	V

#### 4.10 Zante Currant

Black seedless drying grape.

Clone	Accession	Source	Comments	Available
F2V6 FSAC*		California	F2V6 put through FSAC by DPI Victoria. Original tested positive for V GVA virus.	V

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

## 5. Rootstocks

### 5.1 101-14

Clone	Accession	Source	Comments	Available
2-4-84HT*		Australia	Heat-treated by DPI, Victoria.	N, Q, V
2-5-84HT*		Australia	Heat-treated by DPI, Victoria.	V
123-3HT*	AS785418	Australia	Heat-treated in South Australia.	S
H440A		Australia	Heat-treated in NSW.	N

### 5.2 1045 Paulsen

Clone	Accession	Source	Comments	Available
C8V4*		California	From FPS.	S

### 5.3 110 Richter

Clone	Accession	Source	Comments	Available
A5V19	IV642083	California	FPS 01.	S, V
Q554-01		Canada	Imported from Sidney.	
Requena*	IC648270	Spain		Q
Requena FSAC*		Spain	Requena clone put through FSAC by DPI Victoria.	V

### 5.4 1103 Paulsen

Clone	Accession	Source	Comments	Available
15VC*	IC808339	California		
200 HT*	IC788291	California	From FPS.	N, Q, S
200 HT FSAC*		California	200HT put through FSAC by DPI Victoria.	V

### 5.5 125AA Kober

Clone	Accession	Source	Comments	Available
3 Gm	IC808336	Germany	Imported from Geisenheim.	V

### 5.6 140 Ruggeri

Clone	Accession	Source	Comments	Available
Q45-3A	IC748257	Canada	Imported from Sidney. Tested positive for fleck virus.	N, Q, S
Q45-3A FSAC		Canada	Clone Q45-3A put through FSAC by DPI Victoria.	V
18*	IC808340	France		N, Q, V

### 5.7 225 Ruggeri

Clone	Accession	Source	Comments	Available
D4V10*		California		S

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

## 5.8 3306

Clone	Accession	Source	Comments	Available
RVC		Australia	From Rutherglen, Victoria.	

## 5.9 3309

Clone	Accession	Source	Comments	Available
Rutherglen		Australia	From Rutherglen, Victoria. Tested positive for fleck virus.	

## 5.10 420A

Clone	Accession	Source	Comments	Available
Irymple		Australia	From Western Australia. Tested positive for fleck virus.	

## 5.11 5BB Kober

Clone	Accession	Source	Comments	Available
A10V19*	IC688057	California	FPS 01	N, Q, S, V
A10V19 FSAC*			Clone A10V19 put through FSAC by DPI Victoria.	V
A3V13*	IV662133	California	FPS 02 imported as 5A Teleki. Shown to be 5BB Kober (Wolpert <i>et al.</i> 1994).	Q, S, V
A3V13 FSAC*		California	Clone A3V13 put through FSAC by DPI Victoria.	V
13-44-3 Gm*	IC808337	Germany	Imported from Geisenheim.	
13-45-5 Gm*	IC808338	Germany	Imported from Geisenheim.	S

## 5.12 5C Teleki

Clone	Accession	Source	Comments	Available
A6V18	IV662136	California	FPS 04. Imported as SO4. Shown to be 5C Teleki (Cirami and Whiting 1991). Tested positive for fleck virus.	Q, S, V
A6V18 FSAC*		California	Clone A6V18 put through FSAC in Victoria.	V
6-4-22 Gm*	IC808343	Germany	Imported from Geisenheim.	Q
10-48-49 Gm	IC808344	Germany	Imported from Geisenheim. Tested positive for fleck virus.	Q

## 5.13 775 Paulsen

Clone	Accession	Source	Comments	Available
FPS 02		California	Imported by AVIA.	V
CVT CN		Italy	Imported from Torino.	N, V

## 5.14 779 Paulsen

Clone	Accession	Source	Comments	Available
C8V7*	IS915608	California	FPS clone.	S

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

### 5.15 99 Richter

Clone	Accession	Source	Comments	Available
2-9-285*	AV812582	Australia	From Rutherglen. Heat-treated by DPI Victoria.	
2-9-285 FSAC*		Australia	2-9-285 put through FSAC by DPI Victoria.	V
2-10-285*		Australia	From Rutherglen. Heat-treated by DPI Victoria.	Q, S, V

### 5.16 Boerner

Clone	Accession	Source	Comments	Available
Gm	IC888571	Germany	Imported from Geisenheim, Germany. Distributed by AVIA.	V

### 5.17 Dog Ridge

Clone	Accession	Source	Comments	Available
A6V8	IV592011	California		N
A6V8 FSAC*		California	A6V8 put through FSAC by DPI Victoria.	V

### 5.18 Freedom

Clone	Accession	Source	Comments	Available
D11V1*	IC778281	California	FPS 01	Q
D11V1 FSAC*		California	D11V1 put through FSAC by DPI Victoria.	V

### 5.19 Harmony

Clone	Accession	Source	Comments	Available
A10V7	IV662134	California		Q, V

### 5.20 J17-48

Clone	Accession	Source	Comments	Available
D12V11*	IC688059	California	FPS 01.	V

### 5.21 K51-32

Clone	Accession	Source	Comments	Available
D13V14*	IC688027	California	FPS 01.	Q, V
D13V14 FSAC		California	Put through FSAC by DPI Victoria	

### 5.22 K51-40

Clone	Accession	Source	Comments	Available
D13V15	IC688073	California	FPS 01.	N, V

### 5.23 Ramsey

Clone	Accession	Source	Comments	Available
V1 FSAC		Australia	Put through FSAC by CSIRO.	N, S
A11V2	IV632065	California	Tested positive for fleck virus.	N, Q, S
A11V2 FSAC*		California	A11V2 put through FSAC by DPI Victoria.	V

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

## 5.24 Riparia Gloire

Clone	Accession	Source	Comments	Available
UCD	IV752453	California		V

## 5.25 Schwarzmann

Clone	Accession	Source	Comments	Available
D6-13-3	AC748226	Australia		N, Q
WA5	AW756020	Australia		N, S
WA5 FSAC*		Australia	WA5 put through FSAC by DPI Victoria.	V

## 5.26 SO4

94 INRA	IC808341	France		N, Q, S, V
94 TC1*		France	94 INRA put through virus elimination in Victoria.	

## 5.27 Teleki C

8-285*		Australia	From Rutherglen.	
9-285		Australia	From Rutherglen.	V

\*A vine selected from this clone has been RT-PCR tested and biologically indexed by SARDI and planted in the Australian National Nuclear Grapevine Collection at Dareton in NSW.

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