Horticulture Innovation Australia

Final Report

Assessment of new varieties to improve fruit quality in dried prunes

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Community Horticultural Services

Project Number: DP12000

DP12000

This project has been funded by Horticulture Innovation Australia Limited using the dried prune industry levy and funds from the Australian Government.

ISBN 0 7341 3532 7

Published and distributed by:
Horticulture Innovation Australia Limited
Level 8, 1 Chifley Square
Sydney NSW 2000
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Contents

Summary

The Australian Prune Industry needs to produce a large, high quality product in order to compete for domestic and export markets. Australia is a small producer and in order to match imports from California and South America the industry must find ways of producing a consistent, high quality crop.

Since 2000 the Australian Prune Industry has experienced geographic and climatic changes affecting production. Dry land production in the Young district has declined (43.4% to 8%), production in South Australia is very minimal (10% to 0.4%) while production in the irrigation area around Griffith has grown to over 90% of Australian production (Mooney 2009). Climatic conditions at blossom and harvest have also had an impact on crop size and quality. Packers place extreme importance on fruit size, since consumer preference is for large pitted fruit.

This project follows on from DP04005 (Marte 2007) and DP7004 (Mooney 2012).

This project is aims to further evaluate the suitability of new varieties of prunes under Australian conditions against the industry standard d'Agen. D"Agen is a French variety that is medium-sized, egg-shaped fruit with dark skin and sweet flavoured flesh. The drying ratio averages 3:1 with a small, smooth, flat and long-oval pits. Australian growers use clones of the French prune 303, 698 and 707 which originated in Bordeaux. These clones have similar characteristics to the French prune. Different varieties may provide expanded blossom and harvest windows, avoiding total crop losses due to climatic extremes. New varieties may also provide larger fruit with consistent, high quality parameters, improving uniformity in processing.

Expanding blossom and harvest windows minimizes the effect of climatic extremes at blossom and harvest and also allow for better economic use of harvest and dehydration facilities. Entire crops can be wiped out if all trees blossom at the same time and if that corresponds with a period of high temperatures and hot winds. Expanding the harvest period allows fruit to be harvested at optimum sugars and firmness without overtaxing limited dehydration facilities. The outcome is higher quality dried product.

By assessing new prune varieties the Australian Prune Industry hopes to improve the quality of domestic prunes. Varieties grown in other countries are not necessarily suited to Australian climate, prune production methods and requirements.

The varieties included in this project are Sutter, Van der Merwe, Muir Beauty, California French Improved and d'Agen. Two rootstocks were selected Myrobalan H29C and Marianna 26-24. The trial was planted in 2010 at Darlington Point New South Wales (NSW), Yenda NSW, Cobram Victoria (Vic) and Kingsvale NSW.

A previous variety trial (Marte 2007) had investigated new varieties including California French Improved and Van der Merwe. Project DP7004 (Mooney 2012) established a trial which includes California French Improved, Van der Merwe, d'Agen, Sutter and Muir Beauty as well as using two different rootstocks.

Muir Beauty produce an abundance of early blossom, a heavy crop and large early ripening fruit that does not however dry well in conventional drying systems. Sutter produces robust trees capable of producing large firm fruit which dries and pits well. The Van der Merwe flower early but this does not reflect early fruit maturity. These trees require more intense management strategies. California French Improved is the most important variety in California, the world's largest prune producer. This variety suffered early setback in the trial due to the use of poor budding material. The trees have now caught up to other varieties, but are yet to produce a substantial crop. D'Agen has been the industry standard in Australia since prunes were first grown in the late 1800's. For other varieties to be accepted by Australian growers they must prove they are better than d'Agen in size, sugar content and dry-out ratio.

California French Improved is the most popular variety grown in California, and is now available through a commercial nursery. Van der Merwe, the South African standard has not been widely adopted by the Australian industry because of tree management difficulties. This variety requires annual pruning to ensure fruit size and quality. Muir Beauty produces a large round shaped, sweet fruit which has appeal for consumer size and taste but does not dry well in conventional dehydrators. Sutter produces a firm, large, sweet fruit which dries well. It has also been shown to be a popular variety with some Californian packers.

The main trial site is on a commercial orchard at Darlington Point. The trees have grown since planting in 2010 and are now reaching commercial production levels. A smaller trial site at Yenda experienced severe flooding in March 2012 and as a result tree development was slowed in the 2013/ 2014 growing season. The trial block at Kingsvale was abandoned as the vast majority of the trees and their replacements died due to either drought or effects of frost in spring 2012. No data was received from the Cobram trial block. Fruit from the original planting (DP04005) at Yenda was assessed and included in this project. This block is restored iand now managed by Yenda Producers.

This project also includes an evaluation of rootstock/scion relationships. Overall there is no significant difference between the two rootstocks used in this trial. Two new rootstocks have been planted at Darlington Point, Krymsk^{TM}86 and Krymsk^{TM}1 budded to 707 for continued assessment by industry.

Results are based on visual and measured tree growth as well as fruit evaluation. Information collected includes flowering dates, maturity dates, maturity levels, tree yields, fruit colour and size measurement, dry out ratios and processing acceptability assessments.

Keywords

Prune; variety, rootstock, d'Agen, California French Improved, Sutter, Van der Merwe, Muir Beauty, fruit quality, prune blossom

Introduction

The aim of this project was to allow the Australian prune industry to become economically competitive in the domestic and global market. The Australian Prune Industry strategic plan states the following as one of its goals " To seek new and improved production, dehydration and processing methods through industry led research and development". This will be achieved by the adoption of any outstanding new varieties. These varieties would improve dried product quality and increase blossom and harvest windows to minimize climatic events and make more effective use of processing equipment.

Australia has a total of 1195 hectares (ha) planted to prunes. There are 887ha in the Riverina, 314ha in Young and 14.8ha in South Australia (Mooney 2009). Prune production contributes approximately $10 million to the Australian economy. Australia is the fifth largest producer of prunes (3500 tonnes) in the world behind California, Chile, France and Argentina (International Prune Association).

Project DP04005, Comparative processing and market potential of prune varieties, assessed varieties from other world prune growing regions against the Australian industry standard (Marte 2007).Van der Merwe from South Africa, Muir Beauty and California French Improved were included in project DP07004 (Mooney 2012).

The Australian prune industry standard d'Agen has been used since the late 1800's (Australian Prune Industry Manual). D"Agen is a French variety that is medium-sized, egg-shaped fruit with dark skin and sweet flavoured flesh. The drying ratio averages 3:1 with a small, smooth, flat and long-oval pits. Australian growers use clones of the French prune 303, 698 and 707 which originated in Bordeaux. These clones have similar characteristics to the French prune. Loss of fruit caused by climatic extremes such as high temperatures at blossom and hot, dry winds at harvest encouraged industry to examine different varieties. If flowering and harvest windows can be expanded then increased production is possible. Complete crop failures may be avoided and more efficient use made of processing equipment over a longer time period.

Currently Australian prune production does not meet domestic demand. Consumers prefer a large, pitted dried prune. Fruit from the d'Agen variety produces a good size fruit with high sugar levels and good dry out ratio. New varieties Sutter and Muir Beauty have been included in this trial to address fruit quality parameters as well as harvest windows.

In order for any new varieties to be accepted by growers they must perform equally as well, if not better than the industry standard d'Agen. Sutter, Van der Merwe, Muir Beauty and more recently California French Improved varieties are commercially available in Australia. Industry acceptance will depend on a continuation of the current evaluations.

Methodology

The following methodology was designed by the project leader for all Australian prune growers.

The lead agency for this project changed in August 2013 from NSW Department of Primary Industry to Community Horticultural Services. The project leader did not change.

Co-operators (as per previous project DP07004)

New blocks

Darlington Point	Tony Toscan
	'Cavaso'
	Newell Highway Darlington Point NSW
Yenda	Peter Raccanello
	Barracks Road Yenda NSW
Old Block	Peter Reynolds
	Yenda Producers

Scions used in trial (as per previous project DP07004)

<u>d'Agen</u>

- The Australian industry standard
- Derived from Prune d'Ente (France)

<u>California French Improved</u>

- Developed in California from d'Agen for warmer climates
- The predominant variety used in California
- Vigorous upright tree

<u>Van der Merwe</u>

- Developed in South Africa (released 1954)
- Bud mutation of d'Agen
- Early flowering
- Good fruit set

<u>Sutter</u>

- Released by breeding program at UC Davis in 2000
- Earlier ripening
- Large fruit with high sugar

- Matures earlier than French Improved
- Lower pitting efficiency with certain pitting machines

Muir Beauty
- Developed at UC Davis from a cross between California French Improved and Tulare Giant (released in 2004)
- Blossoms and ripens early
- Large fruit with high sucrose and superior flavour

Rootstocks (as per previous project DP07004)

Both the rootstocks used were developed in California.

Myrobalan H29C

- Resistant to *Armillaria* and Crown Gall
- Moderate tree size
- Good tolerance to dry summer conditions
- Good yields with good fruit quality

Marianna 26-24

- Good yields with good quality fruit
- Less tolerant of heavy soils
- Resistant to Crown Gall

New rootstocks (planted 2015)

Krymsk™86
- Good in replant situation
- Replacement for Marianna
- Low chill
- Waterlogging tolerant
- Salt and high pH tolerant

Krymsk™1
- Russian dwarfing rootstock
- Drought tolerant
- Waterlogging tolerant
- Cold tolerant

Maintenance of trees

The original trial sites were planted in 2010. Trial block plans appear in Appendix 1. Dead trees were replaced at Yenda, Darlington Point and Young in winter 2013. The Young (Kingsvale) block was abandoned in 2014 after severe frost killed many of the trees. Krymsk rootstocks (707 scion) were planted at Darlington Point in May 2015).

Grower co-operators have carried out their usual management practices for the new blocks

Young block trees were pruned by the project leader in winter 2012 and 2013 and by the grower co-operators in 2014.

Full bloom dates

Trial trees were assessed over the blossom period for each season of the project.

2012/13 data was provided courtesy of Tony Napier. 2013/14 and 2014/15 data was provided courtesy of Peter Reynolds. Mode phenology was recorded for each block and variety.

Crop load ratings

In November 2014 crop load estimates were made at Darlington Point and Yenda young blocks. Ratings range from 0 where there was no fruit to 5 for a very heavy crop load.

Tree growth measurements

Tree butt circumference measurements were made using 'Kincrome' digital vernier caliper. Trees were measured 40cm above ground level. Measurements were made in November 2012, April 2014 and February 2015.

Tree height was measured at Yenda in April 2014. Tree heights at Darlington Point do not reflect growth as trees had been hedged.

Fruit quality at harvest

The following parameters were assessed:

Length and diameter of fruit were measured with a set of digital vernier calipers.

Fruit density was measured with a 5mm penetrometer

Saturated sugars were measured with a digital refractometer

Fruit weight was measured on calibrated scales

Technology transfer strategies

- Presentation of results at national conferences and orchard walks
- Project summaries written for industry annual report
- Articles published in industry publication 'The Vine'
- Summary prepared for Prune Industry Manual

Outputs

Presentation at national conferences

Presentations were made at the Australian Prune Industry conferences in Griffith September 2012 and 2014. Trial results and project progress and recommendations were detailed.

Field days

An orchard walk was held at the Darlington Point site in November 2013. It was attended by growers and other interested parties. Participants were able to view the trial trees, listen to a summary of result to date and comment on recommendations coming from the trial.

Results from DP12000 were also discussed at an orchard walk held at the old Yenda trial site in 2014.

Publications

A report for industry on suitability of varieties assessed in this project for Australian prune growers

A summary of the project results and recommendations has been written for inclusion in the Prune Manual

Availability of plant material

The following are now available for in Australia for all Australian prune growers from commercial nurseries:

California French Improved, Muir Beauty and Krymsk rootstocks

Outcomes

All intended outcomes of this project were not achieved. Some trial sites (Young and Cobram) were abandoned. Not all fruit quality parameters for each variety were able to be assessed each season due to lack of fruit set, small crop load, non availability of processing facilities and problems with harvest.

Adoption rates of new variety plantings will not be measurable for several more years.

An additional benefit of the project is the suitability of the Muir Beauty variety to NSW Riverina growing conditions. It produces a robust tree with heavy fruit set and large very sweet fruit that appeals to consumers. It is more suited to the fresh plum market due to its early maturity and taste. Evaluation of the new Kyrmsk rootstocks will provide additional information for industry as these trees develop and commence production.

Blossom

Variety	2012/13	2013/14	2014/15
D'Agen	October 4	September 24	September 26
Van der Merwe	September 17	September 1	September 15
Sutter	October 1	September 28	September 24
California French Improved	October 1	September 20	September 26
Muir Beauty	September 20	September 9	September 13

Table 1 Dates for full bloom (NSW Riverina, Yenda and Darlington Point**)**

Crop load

Variety	Darlington Point	Yenda
D'Agen		
Myrobalan	2	3
Marianna	3	3
Van der Merwe		
Myrobalan	3	3
Marianna	4	3
Sutter		
Myrobalan	2	1
Marianna	1	1
California French Improved		
	2	1
Myrobalan	1	1
Marianna		
Muir Beauty		
Myrobalan	4	2
Marianna	4	3

Table 2 Crop load rating November 2014 (1=very light crop, 5= very heavy crop)

Tree growth

Variety / rootstock	Darlington Point			Yenda		
D'Agen	**2012/13**	**2013/14**	**2014/15**	**2012/13**	**2013/14**	**2014/15**
Myobalan	45.1	95.2	110.2	31.5	75.1	87.3
Marianna	49.3	97.2	112.3	40.8	75.2	96.9
Van der Merwe						
Myrobalan	44.2	91.5	106.3	41.8	81.2	94.6
Marianna	40	92.9	107.5	35.7	78.3	98.5
Sutter						
Myrobalan	45.4	98.3	112.8	40.2	81.8	99.5
Marianna	42.3	93.3	109.1	41.8	81.7	104
California French Improved						
Myrobalan	24	84.5	106.4	28	75.5	92.2
Marianna	41	70.5	92.5	24	70.2	94.8
Muir Beauty						
Myrobalan	51.7	96.4	104.5	40.1	66.7	78.8
Marianna	49.8	83.4	89.8	36.2	67.4	84.3

Table 3 Mean tree butt diameter (mm)

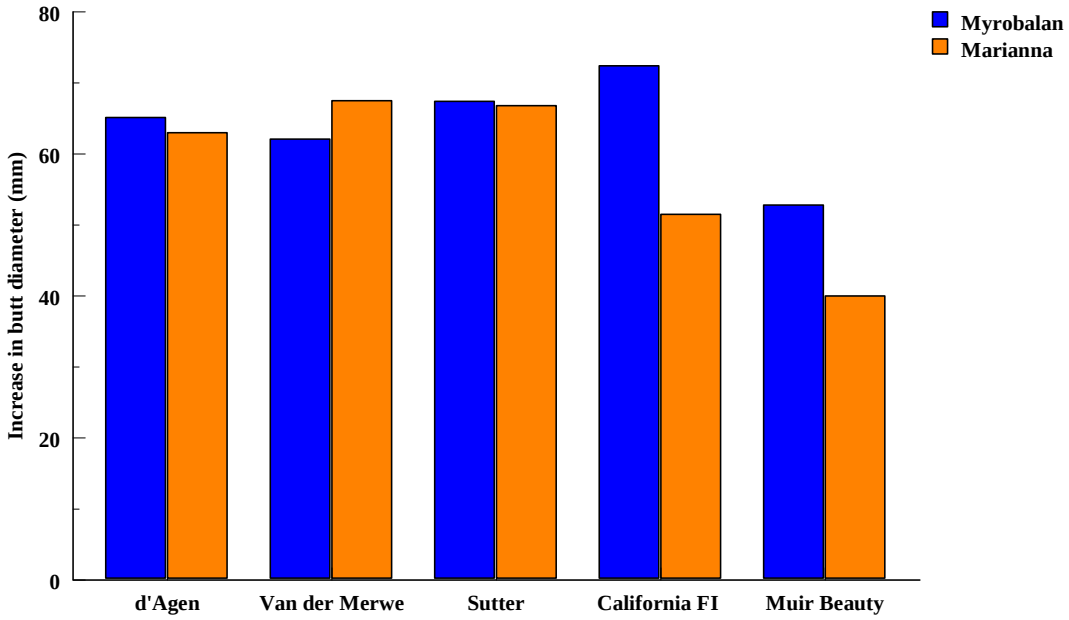

Figure 2 Increase in butt diameter 2012-2015 Darlington Point

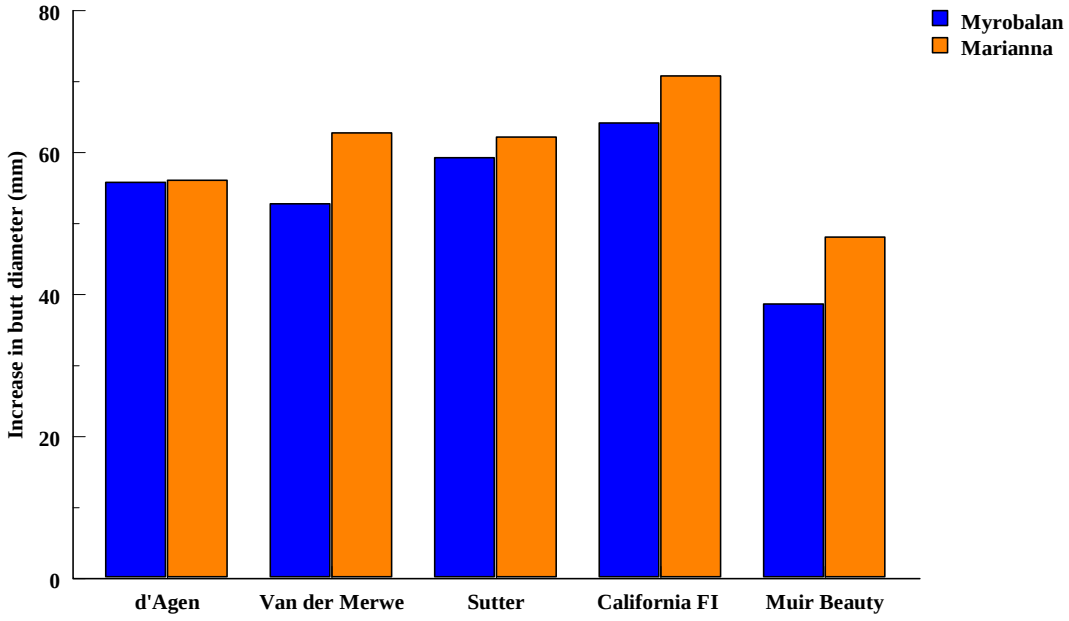

Figure 2 Increase in butt diameter 2012-2015 Yenda

Variety / rootstock	Darlington Point		Yenda	
D'Agen	**2012/13**	**2013/14**	**2012/13**	**2013/14**
Myrobalan	3	3.3	2.5	3.4
Marianna	2.9	3.4	2.5	3.4
Van der Merwe				
Myrobalan	3.1	3.4	2.7	3.8
Marianna	3	3.3	2.4	3.4
Sutter				
Myrobalan	2.8	3.5	2.3	3.5
Marianna	2.7	3.3	2.1	3.5
California French Improved				
Myrobalan	2.1	3.3	2.1	3.4
Marianna	2.1	3.3	2.1	3.5
Muir Beauty				
Myrobalan	3.6	3.5	2.7	3.2
Marianna	3.1	3.3	2.5	2.9

Table 4 Mean tree height (m)

Fruit qualities at harvest

Variety	Block	Brix	Density	Dry out ratio
California French Improved	Old Yenda	28.1	2.4	3
Van der Merwe	Old Yenda	27.4	2.8	3
	Darlington Point	19.4	2.1	2.6
d'Agen	Old Yenda	25.4	2	3.2
	Yenda	19.3	2.4	2.8
Muir Beauty	Yenda	25.8	1.6	1.9

Table 5 Harvest Parameters 2012/13

Variety	Block	Brix	Density	Dry out ratio
California French Improved	Old Yenda n=50	24.4	2.5	2.9
Van der Merwe	Old Yenda n=50	26.1	2.7	2.7
	Yenda (Myrobalan) n=24	25.5	1.8	2.8
	Yenda (Marianna) n=50	25.8	1.9	2.8
	Darlington Point (Myrobalan) n=25	24	3.4	2.7
	Darlington Point (Marianna) n=25	24	3.4	3.1
d'Agen	Old Yenda n=50	21.1	2.4	3
	Darlington Point (Myrobalan) n=25	22.6	3.5	3.4
	Darlington Point (Marianna) n=50	22.2	3.2	2.6
Muir Beauty	Yenda	26.2	1.5	

Table 6 Harvest Parameters 2013/14

Variety	Block	Brix	Density	Dry-out ratio
California French Improved	Old Yenda n=50	20	2.8	3.2
	Darlington Point n=50	24.1	2.7	2.3
	Yenda n=50	24.4	2.3	
Van der Merwe	Old Yenda n=50	18.4	3.7	4
	Darlington Point n=50	21.6	3.2	3.3
	Yenda n=50	21.9	3.2	1.9
d'Agen	Old Yenda n=50	19.7	2	3.3
	Darlington Point n=50	21.7	2.1	2.6
	Yenda n=50	23.6	1.9	2.5
Muir Beauty	Darlington Point n=50	26.1	0.7	4.1
	Yenda n=50	26.7	1.4	3.9
Sutter	Darlington Point n=50	26	2.6	3.3
	Yenda n=50	26.3	2.9	2.8

Table 7 Harvest Parameters 2014/15

Evaluation and Discussion

Varietal trials are a long term industry investment. Trees take around 4-5 years to reach commercial production and results can be influenced by climatic conditions and varying crop loads. For example the value of an early blossoming variety would become evident in a year when adverse weather conditions occur at the time of d'Agen flowering.

As these trials are on commercial orchards they are also affected by owner management practices. Several times throughout this project trees were harvested, dried and stored before the different varieties of fruit could be assessed. Dehydration practices vary between operators. Large quantities of dried fruit are required for processing, pitting and consumer evaluation.

Improved results could have been obtained if fruit assessments were carried out individually as fruit reached optimum fruit sugars and density instead of when driers and machinery became available.

Tree growth measurements were affected by drought, frost and subsequent tree death in Young, flood in Yenda and use of poor budding material for the California French Improved variety.

Fruit quality parameter measurements have been affected by harvest times. Not all varieties were harvested at optimum Brix and density. Assessment dates were to suit grower cooperator management requirements.

More cooperation is needed from packers to obtain pitting data on smaller quantities of fruit. Fruit varieties need to be kept separate for assessment and comparison.

Delivery mechanisms including conferences and field days were successful even though not many were held. Approximately twenty growers attended the orchard walks and more attended the two national conferences.

Feedback from two grower cooperators has been useful. Some Muir Beauty fruit has been picked for an early fresh market and more of this variety has been planted. One grower has attempted to sun dry this variety to overcome bleeding issues in drying tunnels.

California French Improved does not appear to have any advantages over d'Agen, despite being the variety of choice of many Californian prune growers.

Sutter shows promise when compared to d'Agen. It has large fruit with high sugars and consistently high density and dry-out ratio. It has proven to be a popular choice with several Californian prune packers (including Taylor Brothers) because of these parameters.

Van der Merwe, the South African dominant variety, blossoms approximately 2 weeks ahead of d'Agen. Early blossoming does not correlate with early maturity. This variety matures at the same time or later than d'Agen. Van der Merwe is a heavy cropping variety which requires more labor intense management practices especially pruning. Performance of this variety is no better than the industry standard.

Muir Beauty shows promise in early blossoming and maturity. Early maturation could be a handicap as harvest machinery would need to operate at different times to the d'Agen clones. There is a dehydration problem with this variety. Bleeding during progress through the drying tunnel, causes damage to drying trays. The dried fruit is large and sweet, but the product does not dry out at the same operating temperature and timing as d'Agen. Fruit is able to be machine pitted.

Muir Beauty and Van der Merwe flower 10 -14 days before Sutter, d'Agen and California French Improved (Table1). Over the 3 seasons the early flowering varieties reached full bloom between September1st and 20th. The other varieties reached full bloom between September 20th and October 4th.

Muir Beauty produced a heavy crop in 2012/13, 2013/14 and 2014/15 (Table 2). Darlington Point produced a larger crop than Yenda due to heavy winter pruning at Yenda. Examination of the Muir Beauty trees in February 2015 indicates a heavy crop again next season. Sutter and California French Improved produced a light crop in 2014/15.

There is no difference in tree growth rates (butt circumference) between rootstocks. At Darlington Point only California French Improved and Muir Beauty had increased growth on Myrobalan compared to Marianna (Table 3). Muir Beauty at Darlington Point and Yenda showed less vegetative growth than other varieties due to heavy crop loads. Tree growth at Yenda was slower than Darlington Point due to the stress caused by flooding in 2012.

Not all varieties were harvested at peak times. Harvest parameters do not reflect a true indication of sugars and densities as harvest was conducted at times suitable to grower co-operators. Not all varieties were harvested in each season or from each block due to some lack of fruit. D'Agen averaged Brix 21.7 (19.3-23.6), with a density of 2 (1.9-3.5). Van der Merwe averaged 21(19.4-27.4) Brix, with a density of 3.4 (1.9-4). California French Improved averaged 22.8 (20-28.1) Brix with a density of 2.6 (2.3-3). Sutter averaged 26.2 (26-26.3) Brix with a density of 2.8(2.6-2.9). Muir Beauty averaged 26.4 (26.1-26.7) Brix with a density of 1.1 (0.7-1.4). Dry out ratio for d'Agen average was 2.9 (2.6-3.4). Average dry out ratio for Van der Merwe was 2.9 (1.9-4).Average dry out ratio for California French Improved was 2.9 (2.3-3). Average dry out ratio for Sutter was 3.1 (2.8-3.3) and for Muir Beauty 3.3 (1.9-4.1).

This report does not present significant amounts of harvest data from three seasons for all five varieties. It is difficult for prune growers to make the economic investment and replace old trees or develop new blocks based on limited information, particularly when d'Agen and d'Agen clones have worked reasonably well to date.

Myrobalan H29C is the predominant rootstock used by prune growers in the NSW Riverina (Mooney 2008). This project did not find either Myrobalan or Marianna to be a more outstanding performer. Both rootstocks have similar growth rates and suckering, issues that are important to orchard management.

Recommendations

- As these trees are now well established the prune industry should invest in continuation of the assessments on these varieties:

  To compare blossom and harvest windows

  To measure fruit quality results (dry out ratios, fruit size, pitting quality)

  To assess all differences between varieties

  To assess two new rootstocks planted in 2015

  To obtain more consumer feedback on varieties

- That any other varieties coming out of international breeding programs be added to new trials.

- That any variety not suited to Australian conditions or requirements be replaced with new grafts on existing rootstocks

- That the newly planted Krymsk rootstocks be evaluated.

Intellectual Property/Commercialisation

'No commercial IP generated'

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Acknowledgements

The author wishes to acknowledge the assistance of the grower co-operators:

Tony Toscan

Peter Raccanello

The author also wishes to acknowledge the assistance and co-operation of the following people and businesses:

Ian Moss (Mossmont Nursery) for supplying original and replacement trees.

Peter Reynolds (Reynolds Horticultural Services) for providing blossom data and fruit drying.

Yenda Producers for allowing the collection of data from the Duffell trial block at Yenda.

Verity Fruits for pitting fruit in 2013/2014.

Appendices

1.	Trial block plans	Darlington Point
		Yenda
		Old Yenda block
2.	Plates of varieties	Darlington Point
		Yenda
		Old Yenda block
3.	Photos various	Dehydration
		Young frost damage
4.	Fruit assessment photos	

Appendix 1

Darlington Point

N

		Channel		
*	DM	MH	VM	CH
SH	DM	MH	VM	CH
SH	DM	MH	VM	CH
SH	DM	MH	VM	CH
SH	DM	MH	VM	CH
SH	DM	MH	VM	CH
SH	DM	MH	VM	CH
SH	DM	MH	VM	CH
SH	DM	MH	VM	CH
SH	DM	MH	VM	CH
SH	DM	MH	VM	CH
SH	DM	MH	VM	CH
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SH	DM	MH	VM	CH
SH	DM	MH	VM	CH
SH	DM	MH	VM	CH
SH	DM	MH	VM	CH
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM
SM	DH	MM	VH	CM

S	Sutter	H	Myrobalan H29C
D	d'Agen	M	Marianna 26-24
M	Muir Beauty	*	missing
V	Van der Merwe		
C	California French Improved		

Yenda

DH	MM	VM	SH	CH
DH	MM	VM	SH	CH
DH	MM	VM	SH	CH
DH	MM	VM	SH	CH
DH	MM	VM	SH	CH
DH	MM	VM	SH	CH
DH	MM	VM	SH	CH
DH	MM	VM	SH	CH
DH	MM	VM	SH	CH
DH	MM	VM	SH	CH
DH	MM	VM	SH	CH
DM	MH	VH	SM	CM
DM	MH	VH	SM	CM
DM	MH	VH	SM	CM
DM	MH	VH	SM	CM
DM	MH	VH	SM	CM
DM	MH	VH	SM	CM
DM	MH	VH	SM	CM
DM	MH	VH	SM	CM
DM	MH	VH	SM	CM
DM	MH	VH	SM	CM

N

S	Sutter
D	d'Agen
M	Muir Beauty
V	Van der Merwe
C	California French Improved

H	Myrobalan H29C
M	Marianna 26-24
*	missing

Old Yenda Block

303	X	X	X	X	X	X	X	X	X	X	Cacak	X	X	X	X	X	X	X	X	X	X
652	X	X	X	X	X	X	X	X	X	X	d'Agen	X	X	X	X	X	X	X	X	X	X
Cacak	X	X	X	X	X	X	X	X	X	X	652	X	X	X	X	X	X	X	X	X	X
Cacak	X	X	X	X	X	X	X	X	X	X	CFI	X	X	X	X	X	X	X	X	X	X
707	X	X	X	X	X	X	X	X	X	X	698	X	X	X	X	X	X	X	X	X	X
698	X	X	X	X	X	X	X	X	X	X	Cacak	X	X	X	X	X	X	X	X	X	X
d'Agen	X	X	X	X	X	X	X	X	X	X	VdM	X	X	X	X	X	X	X	X	X	X
CFI	X	X	X	X	X	X	X	X	X	X	303	X	X	X	X	X	X	X	X	X	X
VdM	X	X	X	X	X	X	X	X	X	X	707	X	X	X	X	X	X	X	X	X	X

CFI	California French Improved
VdM	Van der Merwe

Appendix 2

Darlington Point

Plate 1 d'Agen

Plate 2 Van der Merwe

Plate 3 Sutter

Plate 4 California French Improved

Plate 5 Muir Beauty

Yenda

Plate 1 d’Agen

Plate 2 Van der Merwe

Plate 3 Sutter

Plate 4 California French Improved

Plate 5 Muir Beauty

Old Yenda block

Plate 1 d’Agen

Plate 2 Van der Merwe

Plate 3 California French Improved

Appendix 3

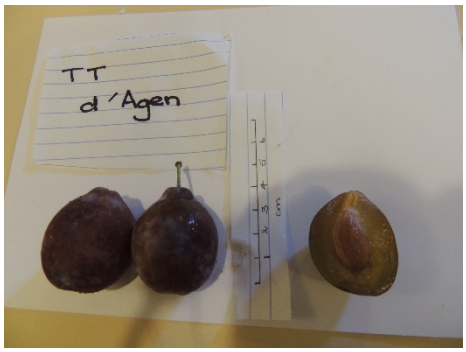
Plate 1 Muir Beauty fruit in drying trays

Plate 2 Sutter fruit in drying trays

Plate 3 Frost damage at Young

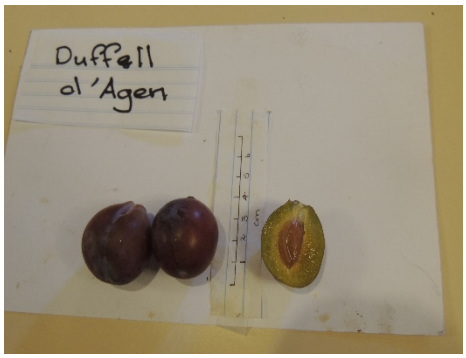
Appendix 4

Fruit Assessment



Darlington Point d'Agen

Yenda d'Agen

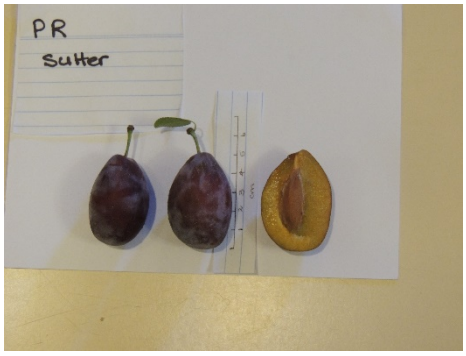


Old Yenda block d'Agen

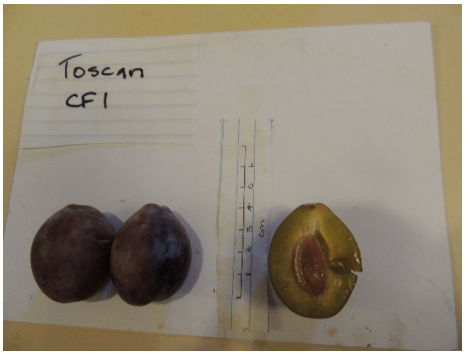
Darlington Point Van der Merwe

Yenda Van der Merwe

Darlington Point Sutter



Yenda Sutter



Darlington Point French Improved

Yenda French Improved

Yenda Muir Beauty