Pear Variety Evaluation & Certification

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Australian Pome Fruit Improvement Program Ltd

Project Number: AP08002

AP08002

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FINAL REPORT

AP08002 (Completion date: 30 July 2013)

"Pear Variety Evaluation and Certification"

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Purpose
This report is to present the Final Report of the project known as AP08002 "Pear variety evaluation and certification"

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Contents

1. Media Summary

The Australian pear industry is on the cusp of renewal with the introduction of world-competitive new varieties – bred in Australia and overseas – allowing the capture of domestic market share and export markets.

Underpinning this potential for renewal and export market capture is a series of services provided by the Australian Pome Fruit Improvement Company Limited (APFIP) through a project funded by the apple and pear levy and Horticulture Australia Limited.

The project, known as "Pear variety evaluation and certification" provides three key services to the Australian pear industry:

- evaluation of new pear varieties:
- certification of the propagules used to create trees of the new varieties; and
- quarantine services.

Evaluation of new pear varieties takes place at 8 sites in regional production areas in Victoria, South Australia, Western Australia, Tasmania, Queensland and New South Wales. During the life of the project some 66 varieties have been partly or fully evaluated. The varieties come from breeding programs in Australia and overseas. Twenty seven new varieties are currently undergoing evaluation. The evaluation process takes seven years for each variety.

Certification of the components used to make a pear tree (propagules) allows growers to access trees that are free of viruses that have an economic impact on the yield of the tree and the quality of the fruit. Processes (heat treatment) have been developed to free pear varieties and rootstocks of viruses and test them to prove that they have not been reinfected. The APFIP Certification Scheme, as witnessed by the APFIP Certification trademark, then provides a systematic approach to ensure that nursery trees are free from these viruses and meet other minimum standards.

Quarantine service provided by the project include liaison with the DAFF quarantine authority through the Post Entry Plant Industries Consultative Committee (PEPICC). PEPICC meets twice yearly and the APFIP Evaluation Coordinator represents the pear industry on the committee. During the life of the project the APFIP General Manager served a period as Chair of PEPICC.

2. Technical Summary

The project provided variety evaluation, tree certification and quarantine liaison services to the Australian pear industry.

Variety evaluation

During the course of the project 66 pear varieties were partly or fully evaluated at up to 8 sites in regional pear production regions. The sites are located on commercial orchards and range from 100 to 400 trees depending on the number of varieties planted. Each site has a support group comprised of local, interested growers.

Once collected, variety performance information and photographs are loaded onto the APFIP Evaluation Database. Reports are produced from the database in various formats for various audiences – ranging from a short, single page snapshot to a national summary of evaluation results to a full report of all the data from all sites at which the variety is planted. Photographs can also be accessed from the database.

Summaries of the data are published in public reports such as APFIP's annual Evaluation Variety Report that is available to all growers via the APFIP website (www.apfip.com), the Australian Fruit Grower magazine and at various industry seminars/meetings. As all varieties are proprietary, only the owners/agents for the variety can access the full variety performance data package.

Certification

Working with the Crop Health Services group of DEPI Victoria, APFIP has developed a series of tools, facilities and systems to allow the delivery of high-health-status pear materials to industry. The tools include on-demand heat treatment for the elimination of virus and procedures for rapid and accurate virus detection/testing. The facilities include the APFIP Repository at Cambridge near Hobart airport. The Repository allows the maintenance of high-health scions and rootstocks and provides for the initial stages of bulking up of pear budwood that has been shown to be free of the viruses of economic importance. The systems relate to the APFIP Certification Database and the Certification Tree Tags that it produces. The tree tags provide for trace back to the source for the propagules (rootstock and scion) that make up the tree as well as identifying the nursery block in which the tree was originally produced.

An important part of the certification component of the project was the promotion of the benefits of planting certified trees to growers and the industry as a whole. This took the form of articles in various magazines and presentations to various industry forums. During the life of the project some 60 articles and presentations were prepared for or made to the industry.

Quarantine services

The main role of the project in relation to quarantine services was to represent the pear industry on the DAFF Post Entry Plant Industries Consultative Committee (PEPICC). This is the main national advisory committee, on quarantine matters, to the Australian government. During the time of the project a major task of the PEPICC was to advise DAFF on the restructuring of post entry quarantine in Australia and the development of the new quarantine facility at Attwood near Melbourne airport.

3. Introduction

This project provides variety evaluation and propagule certification for the Australian pear industry.

3.1 Evaluation

New varieties are the main source of innovation in the fruit industry. They provide new features and benefits to attract consumers, new agronomic advantages for growers, the chance to replant with more productive management systems etc.

At the same time, choosing the right new varieties is also one of the biggest risks a grower faces. Planting a new orchard is expensive. If the variety is not wanted by the market or doesn't perform agronomically, that investment can be wasted.

Many new pear varieties are sourced from overseas. This project provided data related to the performance of new varieties in a range of Australian production environments. This data helps the grower – usually the main investor in a new variety – manage the risk that the new variety is not suited to the grower's production region.

Aim: To provide the Australian pear industry with independent performance data on new varieties in local production environments.

Strategy: capture variety performance data from an independent network of trial sites in all pear production regions, linked and integrated through a central database allowing accurate reporting of variety performance on a region by region basis.

3.2 Certification

Research in Australia and overseas has shown that utilising propagules free of known viruses can result in significant increases in yield[1] and quality. The APFIP Certification System provides a mechanism for delivering to industry high quality trees that:

- are propagated from components free from important viruses (apple stem grooving, apple stem pitting, apple mosaic and apple chlorotic leaf spot . Note: although these viruses have apple in their name they also affect pears)
- are true to type
- meet a minimum nursery tree specification

Aim: To provide nursery and grower access to pear tree propagules and trees that are known to be free of viruses of economic significance, true to type and that meet a designated minimum specification.

Strategies: To develop the tools, facilities and systems that allow the delivery of certified propagules to nurseries and so certified trees to growers. To build awareness of the value of certified trees to the industry through articles, presentations and practical demonstrations

[1] Wilhelminadorp research station in Holland evaluated the effect of virus on the production of Golden Delicious over 14 years by comparing virus-free and virus-infected trees in the orchard; the results are detailed below.
Virus-free: 327 kg per tree
Virus-infected: 279 kg per tree (17% less)
The difference in production per tree over 14 years = 48kg. Multiplied by 2300 trees per hectare = 110,400kg (110 tonnes) which = 7.8 tonnes per year less production from virus infected trees. The same loss in production was consistent in other varieties and also with pears. This trial looked at production only and did not take into account the fact the fruit quality was also affected by virus.

4. Materials and Methods

The project applies the APFIP network of evaluation sites, and the APFIP certification scheme, to pears.

4.1 Evaluation

APFIP operates 8 evaluation sites across Australia. During the life of the project, all of these were utilised for pear evaluation (Table 1). At the end of the project only the Goulburn Valley, Orange, Lenswood, Batlow and Stanthorpe sites were being used for pears.

Table 1: APFIP pear evaluation sites

State	Region
Tasmania	Huon Valley
Victoria	Goulburn Valley
Victoria	Yarra Valley
New South Wales	Orange
New South Wales	Batlow
South Australia	Lenswood
Western Australia	Manjimup
Queensland	Stanthorpe

Each site is located on a commercial grower's property (the site Custodian). Sites vary from 100 to 400 trees depending on the number of varieties planted. The sites are operated under current "best practise" agronomic methods. Each site has a support group comprised of local, interested growers. The group is known as the "Regional Evaluation Group" and it supervises a contracted data collector (the "Observer"). All these persons are contracted to APFIP and the contract covers obligations such as the non-disclosure of information to people outside the group.

Once collected, variety information and photographs are loaded onto the APFIP Evaluation database. Reports are produced from the database in various formats for various audiences – ranging from a short, single page snapshot or national summary of evaluation results to a full report of the data from all sites at which the variety is planted. Photographs can also be accessed from the database.

The data is also published in public reports such as APFIP's annual Evaluation Variety Report that is available to all growers via the APFIP website (www.apfip.com), the Australian Fruit Grower magazine and at various industry seminars/meetings. Due to the proprietary nature of all varieties, not all stakeholders can access all data related to the variety.

4.2 Certification

The heart of the certification scheme is APFIP's Certification Trade mark (registered number 964237) that has been registered for *Malus* (apple), *Pyrus* (pear) and *Cydonia* (quince). The trademark can only be used (and this is strictly enforced) when rootstock and scion propagules have been produced according to APFIPs carefully developed certification rules.

APFIP has worked closely with the Crop Health Services group of DEPI Victoria to develop an "on demand" heat treatment service for virus elimination and a virus testing service.

Other tools and facilities at the disposal of APFIP for its certification work include;

The APFIP **Repository:** This facility allows for the maintenance of high-health-status nuclear material of varieties at Cambridge (near Hobart airport) in Tasmania. Nucleus material is provided from the repository to nurseries for use with the APFIP Certification trade mark. The Repository is used for the production of certified pear propagules. At the Repository, APFIP holds certified budwood material of Packham's Triumph, Williams Bon Cretin (Bartlett), Burre Bosc and Burre Hardy plus the quince rootstocks C, BA29 and A. This material has been distributed to all APFIP licensees for tree propagation and bulking up.

The online **Certification Database**. This database is used as a method of stock control and for providing trace back to the source materials from which a certified tree was propagated. The database also provides the data printed on the certification tags. This includes

- a code describing the budwood
- a code describing the rootstock
- a code describing the nursery block in which the tree was grown

From the data printed on the certification tag, the history of the scion material can be interpreted. This data includes the number of the budwood tree, in a certified nursery, from which the scion material was taken, heat treatment (if any) details, virus status and trueness to type. The data recorded on the tag allows the tree propagules to be traced back to the nucleus material of the variety held in the APFIP repository.

APFIP continues to use the services of Nation Wide Trees in Victoria to propagate the three certified Quince rootstocks (Quince A, Quince C and Quince BA29). This material has also been distributed to APFIP licensees for propagation.

Promotion to industry of the value of certified plant materials free of viruses of economic importance is via articles in the Australian Fruit Grower magazine and presentation at various industry meetings and seminars.

5. Results

5.1 Evaluation

Table 2: Varieties currently under evaluation and that have been evaluated during AP08002

APFIP Material Register and Evaluation Status • Inactive • Active • Current Status

			APFIP Evaluation Areas										Last Updated 23/4/2013			
	Variety	**Supplier**	HUON VALLEY TAS	GOULBURN VALLEY VIC	YARRA VALLEY VIC	ORANGE NSW	MANJIMUP WA	LENSWOOD SA	BATLOW NSW	STANTHORPE QLD	APFIP REPOSITORY TAS	Post Entry Quarantine	*General access 3 years data*	*Eliminated due to supplier notification or performance*	*Supplier requested data only*	*Currently still being evaluated*
	Pears															
AP129	A42-63	DPI Victoria		•	•			•						•		
AP130	B31-29	DPI Victoria		•	•			•							•	
AP131	C01-49	DPI Victoria		•	•			•							•	
AP132	C27-42	DPI Victoria		•	•										•	
AP133	C31-42* 131	DPI Victoria		•	•			•							•	
AP134	E42-98	DPI Victoria		•	•			•							•	
AP135	F11-82* 118	DPI Victoria		•	•			•							•	
AP140	Selection 96-21	DPI Victoria			•			•						•		
AP141	Selection 95-22	DPI Victoria			•			6								•
AP142	Selection 94-04	DPI Victoria			•			6								•
AP143	Selection 96-37	DPI Victoria			•			6								•
AP144	Selection 97-08	DPI Victoria			•			•						•		
AP232	ANP05-34/G-28-19	DPI Victoria		11			11	11	11							•
AP233	ANP07-11/G-32-17	DPI Victoria		11			11	11	11							•
AP234	ANP06-44/K-19-77	DPI Victoria		11			11	11	11							•
AP235	ANP06-48/K-21-78	DPI Victoria		11			11	11	11							•
AP236	ANP05-14/E-22-34	DPI Victoria		11			11	11	11							•
AP237	ANP10-01/BB-29-65	DPI Victoria		11			11	11	11							•
AP226	Delsanne	ANFIC NSW		9	•			9								•
AP094	P011R12T090	ANFIC NSW/Prevar	•										•			
AP095	P037R48T081	ANFIC NSW/Prevar	•										•			
AP098	P202R135T158	ANFIC NSW/Prevar	•										•			
AP119	P128R68T003	ANFIC NSW/Prevar		9				9								•
AP137	P139R91T042	ANFIC NSW/Prevar	•		•	•		7	7							•
AP211	P139R91T033	ANFIC NSW/Prevar		8	•		9	8	8	8						•
AP212	P205R130T109	ANFIC NSW/Prevar		8	•		9	8	8	8						•
AP217	P095R15T036/CRISPIE	ANFIC NSW/Prevar		8	•		9	8	8	8						•
AP218	P098R01T045/MAXIE	ANFIC NSW/Prevar		8	•		9	8	8	8						•
AP219	P161R117T099	ANFIC NSW/Prevar		8	•		9	8	8	8						•
AP220	P002R20T115/NELLIE	ANFIC NSW/Prevar		8	•		9	8	8	8						•
AP221	P133R76T058	ANFIC NSW/Prevar		8	•		9	8	8	8						•
AP223	P144R100T001	ANFIC NSW/Prevar		9				8								•
AP224	P202P137T086	ANFIC NSW/Prevar		9												•
AP225	P202P136T118	ANFIC NSW/Prevar		10	•											•
AP084	Williams	APFIP Ltd									•					
AP136	Corella	APFIP Ltd														
AP229	Burre Bosc	Hansen Orchards									•					
AP093	P011R11T155	Hort Research/ANFIC	•										•			
AP096	P045R04T021	Hort Research/ANFIC	•										•			
AP097	P094R15T155	Hort Research/ANFIC	•										•			
AP099	P202R135T159	Hort Research/ANFIC	•										•			
AP100	P202R136T118	Hort Research/ANFIC	•										•			
AP101	P202R137T086	Hort Research/ANFIC	•										•			
AP102	P204R135T058	Hort Research/ANFIC	•										•			
AP112	P13R24T98	Hort Research/ANFIC														
AP113	P189R128T039	Hort Research/ANFIC	•												•	
AP114	P011R12T132	Hort Research/ANFIC	•	7	•	7		7	7							•
AP115	P124R60T027	Hort Research/ANFIC	•	7	•	7		7	•							•
AP116	P076R02T021	Hort Research/ANFIC	•	7	•	7		7	7							•
AP117	P132R92T031	Hort Research/ANFIC	•	7	•	7		7	7							•
AP118	P013R24T098	Hort Research/ANFIC	•	9	•	7		7	7							•
AP120	P202R137T052	Hort Research/ANFIC														
AP138	P013R24T078	Hort Research/ANFIC	•												•	
AP139	P11R11T128	Hort Research/ANFIC	•												•	
AP029	Buerre Hardy	Jill Cambell (OAI)									•					
AP030	Packhams Triumph	Jill Cambell (OAI)									•					
AP227	Rode Doyenne Van Doorn/Sweet Sensation	Next Fruit Generation									•					
AP228	UTA/ Dazzling Gold	Next Fruit Generation									•					
AP230	Thimo	Next Fruit Generation									•					
AP231	FM324A135	Next Fruit Generation									•					
AP238	Quince Eline	Naktuinbow										13				
AP033	Rogue Red	Stoneville Research WA		•									•			
AP034	Eldorado	Stoneville Research WA		•									•			
AP035	Howell	Stoneville Research WA						•					•			
AP036	Bittura Precoce Morettini	Stoneville Research WA		•				•					•			
AP037	Red Clapps	Stoneville Research WA		•									•			
		For sites	Red mumbers indicate yesr of planting													
		For PEQ	Red numbers indicate year of release													

Varieties under evaluation and which have completed evaluation.
Table 2 above provides a listing of the pear varieties that are undergoing evaluation (at 5 sites across Australia) and of other varieties that have been evaluated during the life of the project. Note that complete evaluation takes of the order of 7 years.

Currently (at the end of the project), 27 varieties are being evaluated at 5 sites. The varieties are mainly from the previous DEPI Victoria pear breeding program at Tatura and from the Prevar Limited breeding program with Plant and Food Research, New Zealand.

APFIP also has a relationship with Next Fruit Generation from Belgium and four of their varieties are being held in the repository.

The APFIP Variety Report for 2012 reports the pear variety evaluation work to industry and all stakeholders. A copy of the 2012 Variety Report is provided at Attachment 1.

5.2 Certification

The bulking up of materials for release is a slow and complex process, made more difficult by the need for nurseries to keep certified materials segregated from other materials to prevent virus transfer. Figure 1 provides a plot of the build up in the numbers of Quince A rootstocks. Note that this has been an essentially linear function. This is because the APFIP process is not a commercial one and the area available is small. All propagules produced are provided to industry. However, exponential growth is possible once the initial infrastructure (stool beds and certified budwood trees) is in place in a commercial nursery.

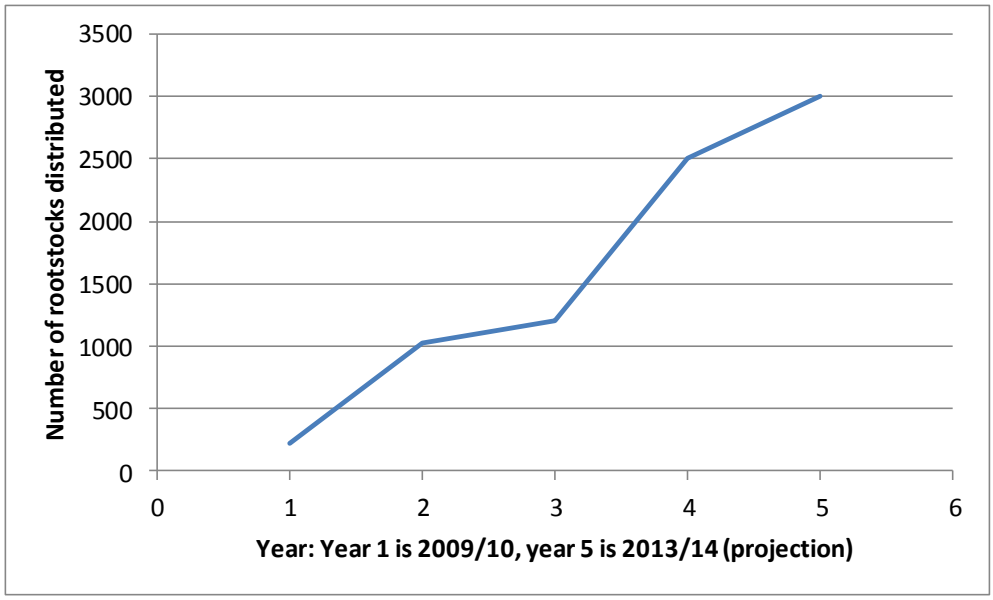

Figure 1: Build up in the number of Quince A certified pear rootstocks – 2009 to 2014

Repository activities
Other certification activities relate to the planting trees of the in the APFIP repository to provide certified budwood of the near-to-commercialisation varieties ANP0118, ANP0131 and ANP0354. Trees of these varieties were also provided to DEPI Victoria for their Pear Field Laboratory planting at Tatura.

Table 3 below reports the increase in availability of certified material - pear varieties and rootstocks – by APFIP over the period 2011/12 to 2013/14 with 2013/14 being a projection.

Table 3: Production of certified pear rootstocks and scion varieties

Variety or rootstock	Number produced and distributed in 2011/12	Number produced and distributed in 2012/13	Projected number for 2013/14
Packham's Triumph	2300 buds	4500 buds/scions	5000 buds/scions
Williams Bon Cretin	3000 buds	6000 buds/scions	6000 buds/scions
Sweet Sensation	Out of PEQ	800 Scions	2000 buds/scions
Dazzling Gold	Out of PEQ	Back into virus elimination	Back from heat treatment
Burre Bosc	Still Completing virus indexing	350 scions	1500 buds/scions
Burre Hardy	400 scions	800 scions	1500 bud/scions
Quince A	1200 rootstocks/cuttings	2500 rootstock/cuttings	3000 rootstock/cuttings
Quince C	1000 rootstocks/cuttings	2100 rootstock/cuttings	3000 rootstock/cuttings
Quince BA29	700 rootstocks/cuttings	1000 rootstock/cuttings	1500 rootstock/cuttings

5.3 Communication/Extension Activities

One of the major strategies utilised by the certification section of the project is to communicate the benefits of planting certified trees to growers. The main communication channels are

- articles in the Australian Fruit Grower (AFG) and Tree Fruit magazines,
- the APFIP website
- direct email to growers
- and presentations to growers at industry meetings

Table 4 provides a list of communication activities related to the reporting or promoting of evaluation and certification for the pear industry. Much of this is done in articles/activities that discuss both apples and pears.

Table 4. Communications activities associated with the project over its life. Highlighted rows represent industry meetings.

Month	Article	AFG	Tree Fruit	Website	Circulated
Oct-09	EC report				•
	Evaluation site weather data	•		•	
Nov-09	News letter				•
	Evaluation site weather data	•		•	
	Evaluation Site Audit				•
Jan-10	EC report				•
	Evaluation site weather data	•		•	
Apr-10	Branching of Nursery trees (IFTA)				•
	Evaluation site weather data	•		•	
May-10	News Letter				•
	Tech Meeting				•
	Annual report summary				•
	Evaluation update				
	Evaluation site weather data	•		•	
Jul-10	Pear Root stock trial report		•	•	
	Evaluation site weather data	•		•	
Aug-10	What is nursery tree quality	•	•	•	
	Evaluation site weather data	•		•	

Month	Article	AFG	Tree Fruit	Website	Circulated
Sep-10	Introduction of APFIP certified nursery trees	•	•	•	
	Evaluation site weather data	•		•	
Oct-10	Plant quarantine for pome fruit budwood importation	•	•	•	
	APFIP News Letter				•
	Evaluation site weather data	•		•	
Nov-10	APFIP variety evaluation network	•	•	•	
	Evaluation site weather data	•		•	
Dec/Jan 11	APFIP variety evaluation report	•		•	
	Evaluation site weather data	•		•	
Feb-11	Introduction of the Tree Procurement Service	•	•	•	
	Pear rootstock orchard walk				•
	Evaluation site weather data	•		•	
Mar-11	Evaluation site weather data	•		•	
	APFIP rootstocks		•		
Apr-11	Evaluation site weather data	•		•	
May-11	APFIP activities report	•	•	•	
	Tree Procurement Scheme flyer	•			
	Evaluation site weather data	•		•	
Jun-11	Evaluation site weather data	•		•	
Jul-11	Pear rootstock trial report			•	
	Evaluation site weather data	•		•	
	APAL road show SA,WA,Vic,Tas,NSW, Old.				
	Shepparton young growers meeting				
Agust-11	APAL conference info and variety display.				
	Evaluation site weather data	•		•	
Sep-11	Pear rootstock trial report		•		
	Evaluation site weather data	•		•	
Oct-11	Certification Article	•			
	Weather data	•		•	
	EC report directors				•
Nov-11	Certification Article		•		
	Weather data	•		•	
	APFIP update Directors.				•
Dec/Jan 12	Weather data	•		•	
Feb-12	Weather data	•		•	
Mar-12	Weather data	•		•	
	APFIP update Directors.				•
Apr-12	Weather data	•		•	

Month	Article	AFG	Tree Fruit	Website	Circulated
	Tree procurement article	•	•	•	
	AF11002 Milestone				
May-12	Weather data	•		•	•
	Variety report	•		•	
	Pear rootstock trial report			•	
	AP10016 Milestone				
Jun-12	Weather data	•		•	
	Orchard walk Flyer				•
	APFIP update Directors.				•
	Variety report /article	•		•	
	Pear walk held				•
Jul-12	Weather data	•		•	
	Pear orchard walk article	•		•	
	Variety display 2012 round				•
	APFIP update Directors.				•
Aug-12	Weather data	•			
Sep-12	Weather data	•			
	AF11002 Milstone				
	AP08003 Milestone				
Oct-12	Weather data	•			
	APFIP update Directors.				•
	Pear rootstock trial walk				•
Nov-12	Weather data	•			
	APFIP update Directors.				•
	Quarantine (PEPICC) article	•		•	
Jan-13	Weather data	•			
	APFIP update Directors.				•
Feb-13	Weather data	•			
Mar-13	Weather data	•		•	
	TPS article	•			
	APFIP update Directors.				•
Apr-13	Weather data	•			
	AF11002 Milstone				•
May-13	Weather data				
	AP10016 Milestone				•
	APFIP update Directors.				•
Jun-13	Weather data				
	Final Report AP08002				•
Jul-13	Pear rootstock trial orchard walk				•

Face to face communication: Regional visits and industry meetings:
An important ongoing role for both the APFIP Evaluation Coordinator and the APFIP General Manager is to visit the main pear growing areas of Australia (Goulburn Valley - Victoria, Southern Victoria, Adelaide Hills - SA, South West WA, Orange - NSW) promoting certification, varieties and rootstocks. A good example was during the June 2012 round of orchard walks for the Future Orchards program –

where under AP08002 APFIP provided fruit displays, photographs and other information on new pear varieties.

Figure 2: APFIP varieties display at the winter 2012 Future Orchards round of farm walks

Additionally, as part of AP10016 (as well as part of this project) APFIP holds an annual orchard walk to view the pear rootstock trial in Ardmona, Victoria. As the trees in the trial have got older these days have been increasingly well attended and the results more immediately applicable (Figure 3).

Figure 3: Pear rootstock trial field day. July 2012.

Further promotion of the pear evaluation and certification wok was achieved in May 2012 by the publication of the 2012 pear rootstock trial results.

5.4 DAFF quarantine, importation of new varieties

The government of Australia decides by what means new plant material can enter Australia. The government approach is based on the various international treaties and agreements to which it is a signatory. The international Sanitary and Phyto-sanitary Agreement (SPS) is one of these and this agreement sets out quarantine principles.

The quarantine system is designed to facilitate trade but at the same time prevent the introduction of exotic pests and diseases into Australia.

Smuggling is seen as the single greatest risk related to the introduction of exotic pests and diseases into Australia. Time in quarantine is seen as key reason why people might try to smuggle plant material rather than bring it into Australia via the proper channels.

In recent years there has been a significant reduction in the time new varieties spend in quarantine - from 3 to 4 years to 15 to 18 months.

This was achieved through AQIS moving to scientifically robust and verifiable testing protocols for identified exotic pests and diseases. HAL project AP01030, to which APFIP contributed financially, resulted in the adoption of new protocols for the detection of viroids and fire blight.

The APFIP Evaluation Manager is a member of the Post Entry Plant Industries Consultative Committee (PEPICC) that advises AQIS on import-related plant quarantine issues. Representation on this committee is open to all industries involved in the importation of plant material into Australia. This has allowed APFIP to progress important pear industry quarantine issues with AQIS. During the term of this project the APFIP General Manager served a term as the Chair of PEPICC. In recent years a major issue for PEPICC was the restructure of Australian quarantine around the new facility at Attwood, Melbourne.

In a separate role APFIP also identifies overseas varieties and rootstocks that may be of value to the Australian pear industry. It then facilitates their introduction to Australia and their evaluation and if required or requested, their certification under the APFIP trademark and associated rules.

Table 5 lists the pear varieties and rootstocks that have been imported by APFIP under AP08002.

Table5: pear varieties and rootstocks imported on behalf of industry by APFIP.

Supplier	Cultivar	Code	AP No	Date in	Date out
Next Fruit Generation	Pear	Thimo	AP 230	Jan-11	Nov-12
Next Fruit Generation	Pear	FM324A135	AP 231	Jan-11	Nov-12
Naktuinbow	Quince	Eline	AP 238	Jan-12	Jul-13

5.5 Summary of results

The main activities undertaken under AP08002 were

- the identification of potentially valuable pear varieties and rootstocks,
- the importation of such pear rootstocks and varieties through quarantine
- the advocacy of the Australian pear industry to the DAFF quarantine service through the PEPICC
- the evaluation of rootstocks (mainly through AP10016) and varieties
- the communication of the results of the evaluations to growers,
- the certification of pear tree propagules (both budwood and rootstocks) including initial bulking up of important rootstocks and varieties at the APFIP repository and
- communication of the benefits of using certified material free of viruses of economic importance.

6. Discussion and Learnings

The services delivered by the project are seen as essential infrastructure for an efficient, world-competitive Australian pear industry.

If Australian producers are to be world competitive, they must have the best varieties and must not be held back by (for example) virus infestation in their trees. Communicating this message to growers and helping overcome some of the certified-tree production gaps (via activities at the APFIP Repository) are also important parts of the project.

The pear evaluation, certification and quarantine service works very well alongside the service provided by APFIP for apples. As such the pear service, for a relatively modest amount of money, can deliver a cost effective result for the pear industry. This is not so much a matter of cross-subsidisation but more related to utilisation of an existing service/system/facility.

The collection, aggregation and reporting of pear variety evaluation data has been refined and is now an effective system for the industry. Due to the proprietary nature of varieties today, not all stakeholders can access all data, but a grower wishing to plant a variety that has been evaluated in the APFIP scheme can ask the variety owner or Australian rights holder to see the evaluation data – a vast improvement over the situation where there was no reliable, independent data available at all.

Many varieties fail evaluation - their performance does not meet the expectations of their owners or agents. Elimination of underperforming varieties at the evaluation stage saves growers from the financial exposure related to planting the wrong variety

As with certification of apples, it has taken some time to build up number of certified tree propagules. The materials developed are distributed to APFIP-certified nurseries and from there can be rapidly increased, once the commercial infrastructure (stool beds and certified budwood trees) is in place.

Perhaps the best example of the success of the pear program is the current, very high level of demand for certified Quince pear rootstocks. These rootstocks are in demand because

- through this project and AP10016 Quince rootstocks have been shown to be well suited to pear production in Victoria's Goulburn Valley (were 90%+ of Australia's pears are grown)
- through this project, certified propagules of the Quince rootstocks are now available
- through the communications aspects of this project, growers and nurseries are aware of the benefits of using certified materials.

Another important industry result is that DPIE Victoria will take the work begun in this project (and AP10016) to a new higher level through their Pear Field Laboratory (PFL) program. Under the PFL program the relationships between variety, rootstock, tree training and agronomic inputs such as irrigation, will be comprehensively studied and the results extended to industry.

7. Recommendations

As noted above, the evaluation, certification and quarantine service provided by APFIP for pears is efficient and effective. While the production of certified tree propagules is still in its early stages it will increase rapidly now that the essential infrastructure for propagation of certified propagules is built up in commercial nurseries.

Essentially there can be only one recommendation arising from this Final Report and that is that the work undertaken by APFIP for the pear industry, through this project, be continued.

APFIP understands that implementation of this recommendation will be subject to the mid term review of AF11002.

8. Attachments

Attachment 1: APFIP Ltd, Variety Report 2012