APFIP certification and evaluation of pome fruit in Australia

Garry Langford
Australian Pome Fruit Improvement Program Ltd.

Project Number: AF10000

AF10000

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FINAL REPORT

AF10000: AUSTRALIAN POME FRUIT IMPROVEMENT PROGRAM LTD

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Apple & Pear Australia — Australian Pome Fruit Improvement Program Ltd — Horticulture Australia

FINAL REPORT: AF10000
Australian Pome Fruit Improvement Program

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PURPOSE

This reports sets out progress to date in the development of the Australian Pome Fruit Improvement Program Ltd. In doing so it provides the Final Report for HAL Project AF10000.

APFIP is working cooperatively with all sectors of the Australian pome fruit industry to deliver the following vision:

"That the Australian Pome Fruit industry will benefit substantially from nursery trees, prepared from certified propagules, being in ready supply; and excellent local performance information on new varieties

REPORT DATE

30 June 2011

FUNDING

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DISCLAIMER:

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Australian Pome Fruit Improvement Program

1. MEDIA SUMMARY

The Australia Pome Fruit Improvement Company Limited (APFIP) provides the Australian apple and pear industries with three main services:

- certification of propagating material (varieties and rootstocks) which helps protect the industries against known viruses;
- independent evaluation of new varieties; and
- facilitating improvements to the quarantine system for apples and pears.

Certification systems help protect the Australian industry from the losses associated with viruses. Viruses of economic significance are widespread in Australian orchards. Using certified propagating material, free from known viruses, can result in up to 20 per cent increase in orchard productivity.

Growers are now able to access a **wide range of new apple and pear varieties** - from many different countries. Having access to independent performance data on such varieties is vital in their selection of which new cultivars to plant.

Commercial exploitation of these new varieties requires an efficient and effective **quarantine system** that allows importation as safely and quickly as possible.

A high level summary of APFIP's activities in these areas is as follows:

- APFIP's certification scheme, as witnessed by its Certification Trade Mark is now licensed to seven nurseries that together propagate 65 per cent of the Australian apple and pear trees. Currently transition to the certification system and bulking up of certified propagules limit actual use of the trade mark;
- APFIP's evaluation program has collected independent data on 139 varieties. Identification of new varieties that perform poorly in a range of Australian production regions has been a key outcome of the program. This has saved growers the investment related to planting a poor performing variety;
- New protocols for testing pome fruit bud wood in Australian quarantine stations were introduced in 2002 following a significant review by AQIS. The review was stimulated by input from APFIP and resulted in the adoption of the viroid and fire blight testing protocols developed under an APFIP project.

AF10000 was a one year project put in place to allow the APFIP program to continue while APAL decided how it wished to go forward with industry services in this area. Highlights during AF10000 were:

- the launch of APFIP's Tree Procurement scheme that allows growers to understand the nursery system and increase their bargaining power with nurseries. The scheme allows growers to receive the tree they want and have specified in their order. Such trees can make a significant difference to early productivity and return on investment;
- the publication of the annual APFIP "Variety Report" describing evaluation activities and being available to the whole industry, and
- the establishment of the first Certification Demonstration Site, utilising the "Fiero" Fuji strain, in Victoria's Yarra Valley.

APFIP's Certification Trade Mark. Registered number 964237

2. TECHNICAL SUMMARY

2.1 CERTIFICATION

By the provision of certified bud wood and rootstocks, APFIP has continued to support the seven nurseries licensed to us the APFIP Certification Trademark. In 2011, approx. 200,000 certified rootstocks, of the industry-requested rootstocks M26 and M9, will be supplied to licensed nurseries. This is around 30% of annual industry requirements. In the next few years, APFIP will be able to many more rootstocks as production increases exponentially.

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 also developed significant tools necessary for the certification of propagules. They include:
Heat Treatment: An "on demand" heat treatment and virus testing service for pome fruit – developed with and delivered by DPI Victoria through its Crop Health Services group;

Repository: A repository for nuclear material of varieties at Cambridge in Tasmania. Nucleus material is provided from the repository to nurseries for use with the APFIP Certification trade mark.

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.

2.2 EVALUATION

To date, one hundred and thirty nine varieties have been entered for evaluation in the APFIP program with the majority coming from breeding programs - in Australia or overseas. The service is used by all Australian apple and pear breeders.

Evaluation agreements are completed and the new varieties are then evaluated in (up to) 9 sites in key apple and pear production regions. Evaluation data is collected by appropriately-skilled, paid contractors in each area. Data collected is strictly confidential and is stored in a secure, web-accessible database. The emphasis is on security of the site, independence of the evaluator and efficiency of the overall process.

After three seasons of data has been collected, approval is sought from the variety owner/manager to publish the information through the APFIP website www.apfip.com.au and via the APFIP Variety Report. Reports can be generated from the database in the areas of, dormant observations, flowering, fruit set, pre and post harvest observations, maturity timing, fruit size and shape, taste, pest and disease susceptibility/tolerance and photographs.

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

The cost of the evaluation network far exceeds its income from evaluation fees. For this service to continue, ongoing industry funding, via the APFIP component of the apple and pear levy, is required.

2.3 POST ENTRY QUARANTINE

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 it 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 General Manager is a member of the Post Entry Plant Industries Consultative Committee that advises AQIS on plant, import-related, 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 pome fruit industry quarantine issues with AQIS.

3. PROJECT OUTPUTS

AF10000 was a one-year project designed to allow the continuation of APFIP operations while APAL and HAL addressed a new approach to variety improvement, evaluation and certification as described in the Variety Improvement Project of the apple and pear R&D Investment Plan *"Innovation making a difference".* In the end it was decided that no change would be made and APFIP would remain responsible for evaluation, quarantine and certification services and that other services would be added to the APFIP portfolio.

During the year, a number of developments were made to the evaluation service and the certification service. These are reported below.

3.1 CERTIFICATION SERVICE 2010/11

Besides the operation of the normal certification service, developments planned to be implemented under AF10000 included:

- the planting of the first Certification Demonstration Site; and
- the launch of the APFIP Tree procurement service.
- finalisation of the certification database

3.1.1 CERTIFICATION DEMONSTRATION SITE

For growers to appreciate the value of certified trees it is important that they can "see with their own eyes" the differences in growth, production and fruit quality that propagation with certified materials makes. To this end APFIP will plant a series of Certified Material Demonstration Sites. The first of these was planted under AF10000. Another three are planned for the next few years.

The concept for the site is a comparison of:

- trees propagated using APFIP-certified propagules in an APFIP-certified nursery; with
- "normal" trees (not produced from certified propagules).

The APFIP Technical Committee decided that the trial design would be to plant 300 (a small, commercial block) certified trees at a single, high profile, site with a similar number of trees propagated from non-certified materials planted along side.

The site has subsequently been planted (under APFIP supervision) at the orchard of David Finger at Launching Place in the Yarra-Valley, Victoria. M26 rootstock was used. David is a leading grower and his orchard has been involved in the "Future Orchards 2012" program. Consequently it has a high profile with growers.

As the trees were only planted in winter 2010, there is little data to report of their growth and establishment. At the time of writing this report the growth measurements for 2010/11 had not yet been made.

3.1.2 LAUNCH OF APFIP TREE PROCUREMENT SERVICE

Service Overview

The broad aims of the proposed APFIP Tree Procurement Service (TPS) are to

- To improve growers awareness of the nursery tree options available to growers (certified/non-certified, rootstocks, tree architecture etc) and to help them specify the tree they want
- Empower growers in their negotiations with nurseries - particularly with respect to setting a detailed specification for the trees they require
- To provide nurseries with a detailed specification of the trees required by a grower
- To ensure growers receive the trees they order
- To improve interactions between growers and nurseries and to be used as a vehicle to promote the value of certification to growers and nurseries.

The service will do this by

- Liaising with the grower
- Liaising with the nursery
- Promoting a two way flow of information between the grower and the nursery related to
    - Grower to nursery: the specification
    - Nursery to grower: costs and tree production issues

Figure 1, below, describes, in broad detail, how the TPS will operate

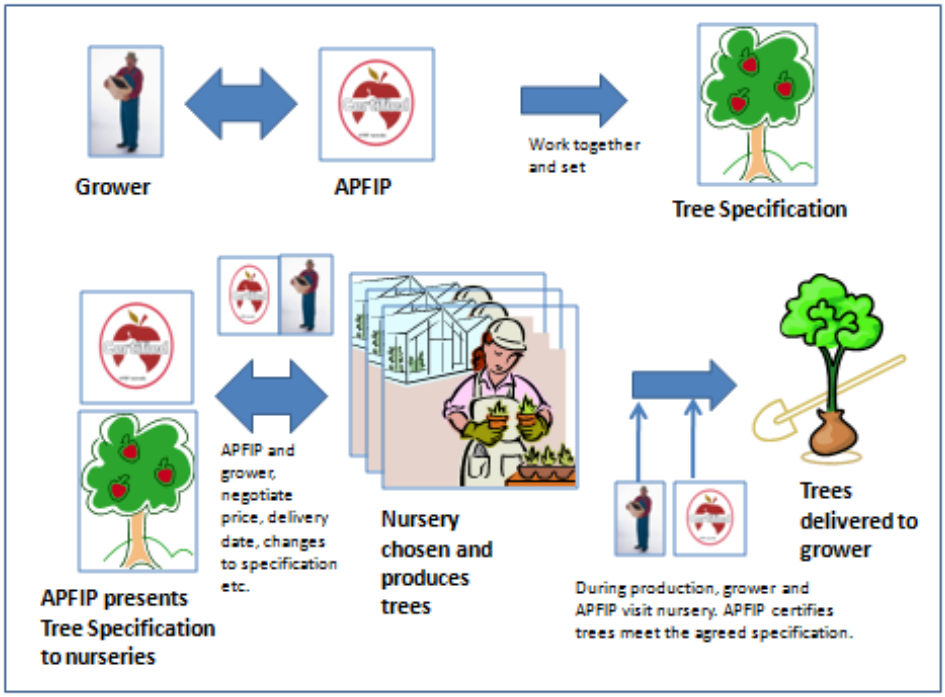

Figure 1, overview of Tree Procurement Service operations. Note that APFIP acts as a conduit between the grower and the nursery on matters such as tree specifications, price and other terms and conditions

Setting the tree specification

Using APFIP's current "Nursery Tree Specifications and Tree Types Description" document as a guide, the grower and APFIP will work together to set the grower's desired tree specifications. The specifications will include;

General

- variety
- rootstock
- scion wood and rootstocks where possible will test negative for the common viruses (e.g. for apples: apple stem pitting virus, apple stem grooving virus, apple mosaic virus, apple chlorotic leafspot virus)
- main roots >250mm after digging
- minimal mechanical damage
- free from lesions, pests (e.g. woolly aphid) and diseases (apple scab, powdery mildew)
- not treated with chemicals to accelerate defoliation other than low biuret urea and copper formulations
- meets phytosanitary requirements of the state where the trees are to be grown
- bundled and transported to ensure minimum damage, roots to remain damp - not to be allowed to dry out.

Tree architecture requirements

- height of bud/graft union above ground
- Trunk calliper at 100mm above the bud/graft union
- Number of branches, height of lowest branch above ground
- Minimum tree height

Appointing a Nursery

Once the specification is agreed, nurseries which could supply the desired trees to the specification would be approached by APFIP. Some nurseries will be immediately eliminated due to the fact that some varieties and rootstocks are proprietary to particular nurseries and therefore will be the only supply option. Conversely some nurseries may chose not be involved with the service.

Once a short list of nurseries had been identified (this may be only one nursery for proprietary varieties/rootstocks) APFIP would then help the grower negotiate the final specification. Frequently there will be compromises between the initial specification requested and what can be delivered.

The grower will negotiate price and time of delivery and enter into a contract with the nursery. Note that APFIP does not contract for the trees. Its role is to help the grower achieve as close to the original specification as possible and to monitor tree development and delivery.

Part of the contract between the grower and the nursery would be that the nursery agrees to allow APFIP to inspect the trees during production and before they are shipped, to make sure that they meet the contracted specification.

Making sure trees delivered meet the agreed specification

During production APFIP would inspect the trees in the nursery. This would be a more general inspection to look for overall uniformity of stocks, any obvious signs of disease or virus in the rootstocks or scion budding/grafting material etc. These visits would also include observation of nutrition and irrigation and any branch initiation treatments. The grower would be encouraged to take part in this inspection to show their interest in the trees to the nursery.

Before the trees leave the nursery, suitably experienced APFIP staff would inspect the trees. Statistically-valid sampling methods would be used. The grower would then be advised of:

- how the actual trees compare to the specification. This would be via a table setting out the details of the specification and the actual details of the trees as measured by APFIP;
- advice as to whether or not the differences between the actual trees and the specification are important or not;
- advice as to whether delivery of the trees should be accepted or not.

Roles that APFIP will not take

APFIP's role is to help the grower set the best possible (achievable) tree specification and to ensure that the delivered trees meet or exceed that specification. It would not;

- Be an agent for the nursery
- Be an agent for the grower
- engage in selling the nursery's left over trees

3.1.3 INTRODUCTION OF CERTIFICATION TAGS AND DEVELOPMENT OF APFIP CERTIFICATION DATABASE

The company selected to provide the Certification Tags was Strapmark Pty Ltd of Dewent Park in Hobart. The APFIP Certification tag has been designed and approved by APFIP. The tag includes the APFIP certification logo and a disclaimer. The first batch of 50,000 tags were printed and delivered to APFIP last year. APFIP is currently coordinating the distribution of these tags to its licensees for the 2011 tree delivery season (winter 2011).

APFIP is continuing to work closely with the Adelaide-based company Netconstructs to finalise the Certification Database. The database is now working and will be fully completed in time for the distribution of the Certification Tags in winter. A screen shot from the database (in this case a screen related to the modification of certification tags) is provided below.

APFIP is currently working with its nursery licensees on the smooth introduction of the database into their businesses with the distribution of certified (and tagged) trees this (2011) winter.
APFIP is also continuing to work with Nation Wide Trees (a specialised propagation nursery in Victoria) on propagation techniques to speed up the delivery of certified rootstocks.

3.2 EVALUATION SERVICE 2010/11

Apple scion and rootstock evaluations continued under AF10000 – pears are not evaluated using the AFPIP component of the R&D levy as the levy is not collected on pears. A highlight for the year was the preparation and publication of the Evaluation Report to industry.

3.2.1 APPLE SCION AND ROOTSTOCK EVALUATION

Currently there are 46 apple varieties and 36 pear varieties undergoing evaluation, in up to seven sites each, Australia wide. Another 22 varieties are being held in the APFIP repository. Eight rootstocks are also being evaluated at up to 6 sites Australia wide. Coordination of evaluation and processing evaluation data from the hundreds of variety x site blocks continues as a major task for the Evaluation Co-ordinator.

Additional activities in this area include:

- Co-ordinating the delivery of 5 new apple varieties from quarantine to be planted into the APFIP repository;
- Work on identifying two new Evaluation Site Custodians who would establish two new evaluation sites in 2011;
- Continued work with variety suppliers (propagating trees and coordinating their delivery) to arrange for the planting of 6 new apple varieties ex the DAFWA breeding program and 5 new pear varieties into APFIP's evaluation sites in winter 2011. Note: the trees delivered by DAFWA were not of sufficient quality to allow them to be planted in winter 2011. They will be grown in the nursery for a further year.

3.2.2 PRODUCTION AND DISTRIBUTION OF THE VARIETY EVALUATION REPORT

The APFIP Variety Report for 2010 was released in November 2010 and distributed via the December 2010 issue of the Australian Fruitgrower. This document;

- Provides an overview of the certification and evaluation services provided by APFIP
- Provides an explanation of the variety reports on the APFIP website and how to read and interpret these reports
- Provides an example of the Weather Summary Report on the APFIP web site and how to interpret these reports
- Reprints an abridged version of the APFIP Annual Report
- Provides evaluation data on 3 new apple varieties (Fiero, Sansa and Rubinstar) and 2 pears (BPM and Red Rogue)

A copy of the 2010 Variety Evaluation Report is provided at Attachment 1.

3.3 QUARANTINE SERVICE 2010/11

The quarantine stations that handle apples and pears for Australia, at both DPIV's Knoxfield site (25km east of Melbourne) in Victoria and at I&I's Eastern Creek site in New South Wales , are to close by direction of DPIV and I&I. Such changes, within AQIS, are largely beyond the control of APFIP and this project.

During this project, APFIP prepared a submission for AQIS on the value, to the Australian industry, of the apple and pear varieties imported into Australia. This submission used a simple methodology [volume (Kg) of imported cultivars produced per annum x average value ($/Kg)] to estimate the value of the imported cultivars of apples and pears to the Australian industry.

The Table 1 (on page 16) shows that in 2007/08, 122,800 tonnes of apples and 130,500 tonnes of pears were produced from imported varieties. Using a conservative wholesale price of $2,000/tonne, the value of the imported varieties to the industry is

Apples	$246	million
Pears	$261	million
Total	$507	million

In the 2011/12 Commonwealth Budget, funds were provided to operate the current quarantine stations as an interim measure – while locations for new quarantine stations were determined and the facilities constructed.

3.4 MANAGEMENT OF APFIP LIMITED

During the one year period of the project, no new developments related to the management of APFIP were put in place, however, the governance and management of APFIP was conducted efficiently and effectively. To this end:

- two meetings of the Board of APFIP were held
- meetings of the Technical Committee of APFIP were held via teleconference and follow-up on email
- the General Manager and Operations Manager were in (almost) daily contact

3.5 TECHNOLOGY TRANSFER

During the one-year term of the project APFIP produced the articles listed in Table 2 (below) for publication in industry magazines.

Table 1. Production of Apples and Pears in Australia by Variety ('000 tonnes), 2007-08

Apple Variety	Australian Production ('000t)	Imported Variety?	Production of imported apple varieties ('000t)	Pear Variety	Australian Production ('000t)	Imported Variety?	Production of imported pear varieties ('000t)
Bonza	1.6	N		Beurre Bosc	8.9	Y	8.9
Braeburn	2.6	Y	2.6	Corella	2	Y	2
Cripps Pink (Pink Lady)	60.5	N		Josephine	3.3	Y	3.3
Cripps Red (Sundowner)	19.9	N		Nashi	2.9	Y	2.9
Delicious - Golden	12.3	Y	12.3	Packham	51.8	Y	51.8
Delicious - Block Red	19.2	Y	19.2	Red Anjou	0.4	Y	0.4
Delicious - Striped Red	19.1	Y	19.1	Sensation	0.6	Y	0.6
Fuji	19.9	Y	19.9	WBC	58.8	Y	58.8
Gala	39.5	Y	39.5	All other pears	1.8	Y	1.8
Granny Smith	58.6	N		**Total production pears**	**130.5**		**130.5**
Jonagold	3.3	Y	3.3				
Jonathan	3.4	Y	3.4				
Lady Williams	2.1	N					
All other apples	3.5	Y	3.5				
Total production apples	**265.5**		**122.8**				

Table 2: technology transfer articles produced by APFIP during the term of the project.

Month	*Article*	*Australian Fruitgrower*	*Tree Fruit Magazine*
Jul-10	Evaluation site weather data	•	
Aug-10	What is nursery tree quality	•	•
Aug-10	Evaluation site weather data	•	
Sep-10	Introduction of APFIP certified nursery trees	•	•
Oct-10	Evaluation site weather data	•	
Oct-10	Plant quarantine for pome fruit budwood importation	•	•
Nov-10	Evaluation site weather data	•	
Nov-10	APFIP variety evaluation network	•	•
Dec-10	Evaluation site weather data	•	
Dec/Jan 11	APFIP variety evaluation report	•	
Dec/Jan 12	Evaluation site weather data	•	
Feb-11	Introduction of theTree Procuement Service	•	•
Mar-11	Evaluation site weather data	•	
Mar-11	Evaluation site weather data	•	
Apr-11	Evaluation site weather data	•	
May-11	APFIP activities report	•	•
Jun-11	TPS mailer included	•	
Jul-11	Evaluation site weather data	•	
Jun-11	Evaluation site weather data	•	

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Australian Apple Growers through the specific APFIP Levy.

Matching funds from the Horticultural Research and Development Corporation and Horticulture Australia Limited.

Members of the APFIP Ltd. Board and Technical Committee

APFIP Ltd. Regional Evaluation Groups, Regional Custodians & Data Collectors

AQIS Post Entry Quarantine stations

Crop Health Services, Department of Primary Industries Victoria, Knoxfield.

5. ATTACHMENTS

2010 APFIP Variety Report