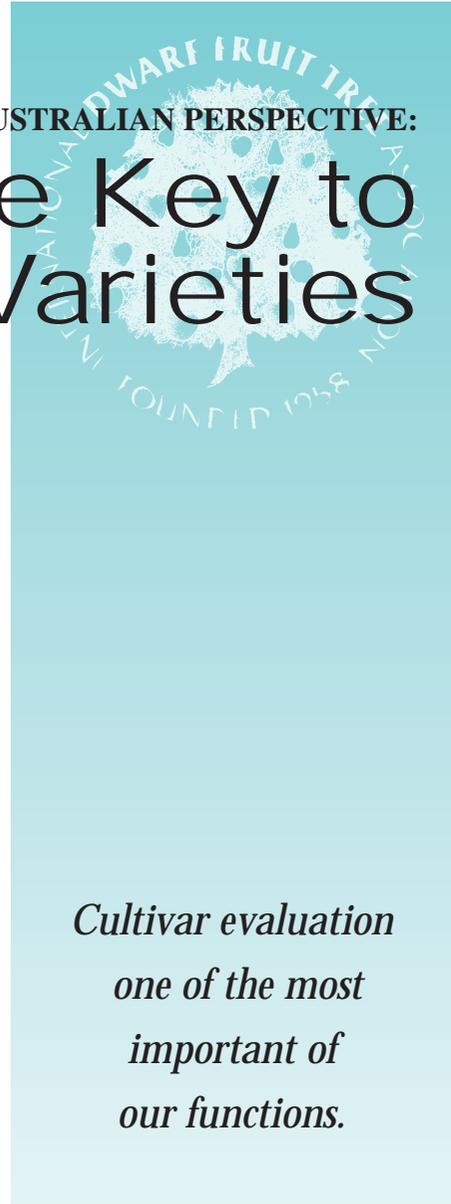


# Evaluation—The Key to Success of New Varieties



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The Australian Pome Fruit Improvement Program Ltd. (APFIP) was formed in February of 1997 after several years of lobbying by Australian growers. The company is wholly owned by the Australian Apple and Pear Growers Association and has been initially funded by a compulsory levy of 1.5 cents (Aust.) per carton of fresh pome fruit. The levy is collected along with other industry levies for research and development, marketing/promotion and industry administration.

The Horticultural Research and Development Corporation, a federal government agency, matches the levy dollar for dollar. The company is managed by a board of 5 directors and activities are administered by a national coordinator. The aim of the company is to become largely self-funded in supplying its services, therefore reducing its reliance on the industry levy by performing commercial operations such as rootstock production. The company has a 2 hectare rootstock production block at Monash in the Riverland of South Australia which is in commercial production of M.26, MM.106 and Ottawa 3 rootstocks.

The company has the following objectives:

- to facilitate equitable and prompt access to high quality pome fruit propagation material and information for the pome fruit industry in Australia.
- to develop pome fruit propagation material with characteristics that will maximize the commercial potential for pome fruit production in Australia.

- to develop and promote standards for pome fruit material that will assist the international competitiveness of the Australian pome fruit industry.

The company has the following six main functions:

- develop and promote standards for pome fruit material.
- evaluate varieties and rootstocks throughout different growing regions.
- facilitate and promote efficient quarantine standards.
- multiply and provide selected budwood and rootstocks.
- safeguard rootstock and budwood material in repositories.
- seek and acquire rootstocks and varieties.

## CULTIVAR EVALUATION

### Background

The pome fruit industry in Australia represents 0.8% of world production, and our growing areas are spread over a continent, ranging from the subtropics in Queensland to latitude 43°S in Tasmania with all the associated climatic differences. Cultivar evaluation is one of the most important of our functions, supplying an information service to the industry.

As recently as the last 10 years, varieties from breeding programs around the world were available for widespread distribution and evaluation, mostly by government departments of agriculture. Rationalization of government agencies in Australia has led to major downsizing, and these agencies no longer have the staff or resources to conduct trials. Elements of

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our industry are comfortable with this as some evaluation carried out by government agencies was perceived as being too scientific and too slow at producing results. The rationalizing effect on government-funded breeding programs around the world has required them to be more income focused. The nursery industry has picked up the baton to a large extent on cultivar evaluation, but their evaluation usually involves only varieties to which they have the rights. No varieties are bred and released to the world just for the satisfaction and the warm inner glow it gives the breeder, it is done for financial return.

### Future

With the focus on income from new varieties, more ways of controlling varieties to maximize returns will come to the fore. Already production royalties are a reality, and with this come specifications for products to meet trademark requirements. How many times have we heard in

our industry: "We grow that variety well here but those guys in . . . do a poor job and spoil the market for us." With a diverse range of growing conditions in Australia, some regions will be excluded from growing a particular variety as it cannot produce to the specification. Growers need to be aware of this information early so they can make business decisions based on sound advice, not just a hunch or anecdotal evidence. New varieties will fail to gain a foothold in the marketplace if they are not grown in the areas best suited to them. The growers will lose money, the variety owner/agent will also lose money and have a variety that is known as a dud in a particular area. That kind of information is the fastest travelling of any news. We are becoming global farmers and, if we are not prepared to move into other growing areas to grow a "winner," we should not do it poorly in our own area. Pink Lady is a good example of this with cooler areas such as the Huon Valley in Tasmania not being able to consistently grow the variety to the specification required for export to the United Kingdom.

### Evaluation Site Setup

APFIP Ltd. has established a network of evaluation sites across Australia for varieties and rootstocks. The focus of infor-

mation collection is balanced between objective and subjective methods. It is important we gather information that growers and variety owners require in a timely manner. Evaluation sites have been established at Stanthorpe in Queensland, Orange in New South Wales, Shepparton in Victoria and Lenswood in South Australia, and sites will be planted in Tasmania and Western Australia this winter.

All these sites have been established using procedures developed in consultation with growers, nurseries and government agencies. The procedures are based on the ISO 9002 standard. There is a general direction for all involved in food production to have effective record keeping procedures in place and the ISO standard offers an effective template for this. The evaluation manual developed so far is stored on our home page at <www.apfip.com.au> under a secure password. Procedures developed are listed in Table 1.

### Evaluation Groups

The evaluation groups in each region have a maximum of 9 members. There is provision for department of agriculture representation in each group, and the majority of group members are growers. The groups operate under the direct control of

APFIP Ltd. Members of the groups who have sites on their properties are regional custodians. All group members sign agreements with APFIP Ltd. to carry out tasks associated with the site in accordance with the procedures. The agreements include clauses for nonpropagation and confidentiality of information collected. Varieties that enter the sites are known only as a code number which is allocated by APFIP Ltd., therefore the growers involved do not know the variety name or its source. This allows us to collect independent and unbiased information.

Evaluation sites are selected by members of the group. This decision is made with regard to knowledge about local growing conditions. Its important not to have sites in areas where the local growers anecdotally think apples and pears grow poorly. The combination of the grower representation in the group and site selection gives credibility to the information that is collected.

Variety owners or agents are required to prove their right to the variety they are proposing to enter for evaluation and also the virus status of the material. The national coordinator supplies basic information about the variety, such as color and season, to the groups.

Although no evaluations have been completed to date, information regarding aspects of tree growth, pest and disease susceptibility/resistance, fruit size, shape, color, and season along with other characteristics will be collected.

### Cultural Practices

Cultural practices for the sites mirror normal orcharding operations, with trees hand thinned because of the diverse and sometimes unknown flowering times. This practice allows us to gather information about variety pest and disease resistance in a functioning orchard. The basics of the evaluation sites design are set out in Table 2.

### Information Release

All information gathered is to be disseminated by APFIP Ltd. in consultation with variety owners. Evaluations will be published in the Australian industry magazine "Pome Fruit Australia," regional pome fruit newsletters and on our home page. We will also conduct displays of fruit in local areas away from the evaluation site, which will not have public access. Obviously where a variety has received a good report of its characteristics

TABLE 1

#### Evaluation procedures.

- Receiving evaluation material
- Trial design
- Site selection
- Chemical use
- Site preparation
- Handling trees before planting
- Establishing trees
- Labeling and identification
- Hygiene
- Post-planting care
- Training and pruning
- Removal of trees
- Records
- Evaluation
- Use of information collected
- Regional evaluation groups

TABLE 1

#### Trial design for variety and rootstock evaluations.

Replication	Rootstocks	Planting distances/orientation	Maximum time in the site
Varieties: 6 trees/rootstock with 3 rootstocks/variety. (Maximum of 18 trees/variety.)	MM.106 is standard to all sites as a control/reference. The other 2 stocks are selected by the groups.	2 meters in rows with no requirement for row widths. Orientation is to be north-south where possible.	7 years, if a variety shows poor characteristics it can be removed earlier.
Rootstocks: 10 trees/stock, with Gala, Fuji and Pink Lady as the scion variety. (Maximum	Comparative stocks are selected by the rootstock owner/agent, a maximum of 2.	Same as for varieties.	Same as for varieties.

in a particular region, the owner or agent will use this to promote the variety/root-stock.

### Evaluation Costs

The evaluation groups currently receive a maximum of \$2,000 (Aust.) per year to maintain the sites, plus \$5 (Aust.) per tree for all new trees planted in the site. This may or not be enough; early estimates show that it will cost approximately \$35,000 (Aust.) per annum to maintain 10 sites. We will continue to monitor this as the sites grow and adjust the financial commitment as required. Because the benefits of effective evaluation impact both the variety owner/agent and growers, both should contribute to the cost. A schedule of fees has been developed for owners/agents based on the number of trees in evaluation. The fees are set at relatively low levels to encourage as many owners/agents to use our network as possible.

## CONVERSION FACTORS ENGLISH VS. METRIC

To convert Column 1 into Column 2, multiply by:	Column 1	Column 2	To convert Column 2 into Column 1 multiply by:
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### Length

.621	kilometer, km	mile	1.609
1.094	meter, m	yard	.914
3.281	meter, m	foot, ft	.3048
39.4	meter, m	inch	.0254
.03281	centimeter, cm	foot, ft	30.47
.394	centimeter, cm	inch	2.54
.0394	millimeters, mm	inches	25.40

metric: 1 km = 1000 m; 1 meter = 100 cm; 1 meter = 1000 mm  
 English: 1 mile = 5280 ft; 1 mile = 1760 yards; 1 yard = 3 ft;  
 1 ft = 12 inches

### Area

247.1	kilometers <sup>2</sup> , km <sup>2</sup>	acre	.004047
2.471	hectare, ha	acre	.4047
.4047	trees/hectare	trees/acre	2.471

metric: 1 ha = 10,000 m<sup>2</sup> = .01 km<sup>2</sup>  
 English: 1 acre = 43,560 ft<sup>2</sup>

### Volume

1.057	liter	quart (US)	.946
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English: 1 US gallon = 4 quarts

### Mass—Weight

1.102	ton (metric), t	ton (English)	.9072
2.205	kilogram (kg)	pound, lb	.454
52.5	ton (metric) of apples	apple packed box, *carton	.01905

metric: 1 metric ton = 1000 kg  
 English: 1 ton = 2000 lb; 1 packed box or carton\* of apples = 42 lb

### Yield or Rate

0.446	ton (metric)/hectare, t/ha	ton (English)/acre	2.242
.892	kilogram/hectare, kg/ha	pound/acre	1.121
.991	ton (metric) of apples/hectare, t/ha	bins* of apples/acre	1.009
.4047	trees/hectare	trees/acre	2.471
0.107	liter/hectare	gallon (US)/acre	9.354

metric: 1 metric ton = 1000 kg; 1 hectare = 10,000 m<sup>2</sup>  
 English: 1 ton = 2000 lb; apple bin\* = 900 lb; 1 acre = 43,560 ft<sup>2</sup>

### Temperature

1.8 C + 32	Celsius, C	Fahrenheit, F	.555 (F-32)
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*\*Commercial cartons (packed boxes) of fruit and field/storage bins of fruit do not have universal weights. The weight of fruit in a packed box or carton varies around the world and with the type of fruit, but is here taken for apples as 42 lbs (19.05 kg); the weight of fruit in a bin also varies but is here taken for apples as 900 lbs (408.2 kg).*