

# **The Winston Churchill Memorial Trust of Australia**

**Report by Gregory Cramond – 2005 Churchill Fellow**



## **French disease resistant apple variety “Ariane”.**

***Project: An investigation of latest advances in integrated European deciduous tree fruit variety trials and evaluation systems, the emergence of sole-proprietary varieties with controlled production and marketing, and their affect on European fruit industries.***

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**Signed ...Gregory Mark Cramond.....Dated 06/01/2006**

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## Introduction

In the Australian spring of 2005 I traveled to and spent 10 weeks in Europe fulfilling my Churchill fellowship. The fellowship allowed me to investigate in-depth European fruit variety research and development and its relevance to Australia's own research and fruit industries. I was able to spend at least three weeks in major growing regions of France, Italy and Germany. Whilst there I was able to follow the harvest most of the way through and gain a good picture of the issues and practices I set out to investigate.

The valuable experience I gained was very much due to the confidence that the Churchill Trust has shown in me and to that organisation I extend heartfelt gratitude.

I felt the entire trip was a great success and this is in no small way because of the assistance I had from friends and family. Particularly to my wife Amy, and two boys Joel and Ethan for their patience and understanding. Also to my parents for helping keep our household in good order whilst we were away.

I must acknowledge the Australian Pome Fruit Improvement Program Ltd, my employer for assisting me in my travels and patiently awaiting my return.

Importantly, I would like to thank all my numerous contacts and now friends in Europe for their candid and accommodating assistance.



“Gold Chief” the new apple variety as seen in the Val de Non, Trentino Province of Italy.

## **Executive Summary**

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The travel was undertaken between the 13<sup>th</sup> of September and the 18<sup>th</sup> of November commencing in the Loire Valley of France. With a specific aim of visiting deciduous fruit tree variety evaluation systems the intent was to cover as much of the harvest season as possible. Then the full range of varieties could be seen and I could be closely involved in the research and assessment of these varieties. With ten weeks of travel, but based in only three regions of major production I was able to look in-depth at the systems, methods and benefits of good R&D in the industries of interest.

### **Highlights**

- International Fruit Obtentions variety development program in the Loire Valley of France.
- Laimburg Research Station in the South Tyrol Province of Italy.
- Konsortium Sud Tirol Baumschule nursery at Corzano, Veneto Province of Italy.
- University of Bologna, Bologna, Italy.
- Institute Agrario Di San Michele All' Adige, Trentino Province of Italy.
- Marktgemeinschaft Bodensee Obst, Friedrichshafen, Germany.
- Komtentenzentrum Obstbau – Bodensee, Bavendorf, Germany.

### **Recommendations**

Variety evaluation and development in Western Europe

- Very strong emphasis on disease resistance breeding.
- Need to address gaps in tree health status of Australian nursery stock.
- Need to address gaps in budwood selection procedures in Australian nursery stock.
- Independence (and perceptions of independence) of evaluation programs hard to maintain, but must be maintained.
- There is a need for breeding programs to access outside and continued funding. With government cutbacks to publicly funded breeding programs there has been much consolidation and rationalisation of these programs and in some instances complete reviews of the program's aims and objectives.
- Regional evaluation of new varieties essential for quality production and as margins get tighter, economic production.

### **Implementation and Dissemination**

- The Australian Pome Fruit Improvement Program will benefit directly from experiences and contacts made whilst in Europe.
- The Australian evaluation program that is managed by me will directly benefit from improvements brought about from my experiences and conclusions.
- Information on my experience and findings will be disseminated through the direct contact with and presentations to Australian growers and through articles penned by me to industry journals.

## **Fellowship Programme**

### **13<sup>th</sup> – 30<sup>th</sup> of September: Loire Valley region of France.**

- Tour of region and farm visits with Bruno Billotte, Fruit Advisor in the region.
- Multibaies Nursery, Cheffes.
- Working with the International Fruit Obtentions variety development program.
- Valois Pepinières Nurseries, Villers Cotterets.
- Davodeau Ligonniere Nurseries, Angers.
- Mondial Fruit Selection, Angers.
- Delbard Pepinières Nurseries, Commentry.
- Centre Technique Interprofessionnel des Fruit and Legumes, St Epain.
- Centre de Recherches INRA, Angers.

### **1<sup>st</sup> – 29<sup>th</sup> of October: South Tyrol region of Italy.**

- Based at Laimburg Research Centre, Pfatten – Vadena.
- Kiku GmbH, Girlan - Cornaiano.
- VOG Ltd, Terlan – Terlano.
- VIP Ltd, Latsch - Laces.
- Feno GmbH, Neumarkt - Egna.
- Beratungsring Extension Service, Terlan – Terlano.
- Consorzio Italiano Vivasti Nursery Group, Ferrara.
- Konsortium SudTiroler Baumschuler, Auer – Ora.
- Lazzeri Agricultural Group, Meran - Merano.
- Istituto Agrario Di San Michele All'Adige, San Michele.
- Istituto Sperimentale di Frutticoltura, Trento.
- University of Bologna – Ordinario di Frutticoltura, Bologna.
- Vivai Mazzoni, Tresigallo.
- Ligogi Baumschule, Bozen – Bolzano.
- Kellerei Tramin GmbH, Tramin – Termeno.
- SK Sudtirol Variety Innovation Consortium, Gargazon - Gargazzone.
- Geos Cooperative, Schlanders - Silandro.
- Gruber-Genetti Nursery – Lana.
- BioExpress GmbH, Bozen – Bolzano.

### **30<sup>th</sup> of October – 18<sup>th</sup> of November: Bodensee region of Germany.**

- Based with Marktgemeinschaft Bodensee Obst, Friedrichshafen.
- University of Hohenheim, Stuttgart.
- Private Obstbauberatung Bodensee, Kressbronn.
- Kompetenzzentrum Obstbau-Bodensee, Bavendorf.
- Rheinland Pfalz, Mainz.
- Webfruit, Langenargen.
- Weber-Bodmann GmbH, Bodmann.
- Apfelhof-Bodensee, Kippenhausen
- Obsthof Strodel, Lindau.
- AgroFresh, Bad Duerrheim.
- Herman Gessler Engineering, Hirschlatt.

## Main Body Text

### France

I spent my three weeks in France based in the Loire Valley region in and around the city of Angers. The Loire Valley is one of the major apple production areas of Europe and enjoys a mild climate very suitable for quality production of pome fruit. Pears were in the past grown in larger numbers, but the prevalence of the Fire Blight disease has pushed production to the less humid south of the country. Apple production is dominated by the variety *Golden Delicious*, but this is changing as growers are diversifying into other new and higher returning varieties.

I chose to spend most of my time in France with the newly formed company International Fruit Obtentions (IFO), which has its new offices in the town of Lezigne 20 odd kilometers to the North of Angers. IFO was formed when the two largest fruit tree nurseries in France chose to combine their R&D sections into a single company. Personnel from both companies were brought together given a single focus, which is advancing high quality fruit varieties to French and European growers and the market place.

The two nurseries that are the parent companies of IFO are Valois and Davodeau Ligonierre. Both Valois and DL were producing around 1.7 million nursery trees each for supply into France and Europe. Add to this about 2.5 million rootstocks and 3 million buds, one can see that they are large companies by anyone's standards. Valois Nursery had it's own separate variety management company, Mondial Fruit Selections. The new company structure is comprised of 50% DL, 25% Valois and 25 % Mondial.

While these are both large companies on Australian terms, the companies involved realized that consolidation of their R&D enterprises would be of benefit to both themselves and the French fruit growing communities. The two companies retain their commercial nursery arms as separate bodies, but the research and development now under IFO is able to expand its operations and coverage of variety testing with as single focus. The new company is now charged with testing all the varieties previously accessed by Valois and DL. Add to this both companies had small breeding programs of their own and had a stock of material for further testing. While IFO is now using all four existing Valois and DL test orchards, a new single site based in the Loire Valley is being established.

My host in France is Emanuel de Lapparent, the manager of IFO. Hyperactive, polite and helpful to a fault, Emmanuel's enthusiasm and organisation skills are no doubt a huge asset to the new company. Emmanuel gave me a rundown on the operations of IFO and also helps me with my sorely missing French language skills. While Emmanuel spends much of his time in the office these days, at harvest time however it is all hands on deck and he is in the fields evaluating with his team comprised of researchers drawn from both parent companies. Emmanuel explains the evaluation of fruit varieties in these basic stages:

IFO separates it's testing into Stages 1, 2 & 3.

Stage 1 is separated into two parts: Hybrid testing, which involves the rudimentary weeding out of reject material and a number of years of testing on promising selections before progress to Stage 2 can occur. Secondly, there are mutants (strains) and varieties from overseas or outside breeding programs. Here the testing is different than with hybrids and involves a “snapshot” view that is able to quickly ascertain a variety’s suitability to growing conditions. Varieties of common knowledge are used for comparison purposes. Several well-known quality parameters are used in Stage 1 testing; varieties not able to meet these basic requirements are quickly discarded.

Stage 2 evaluations involve more in-depth testing, where a larger number of trees of each cultivar are planted often on different rootstock combinations. Evaluators undertake several tests including storage tests and now look quite closely at the variety’s characteristics. Again “standards” or varieties of common knowledge are used for comparison purposes. Sometimes acting on gut feeling exceptional hybrids or advanced mutants are concurrently placed into both Stages 1 and 2.

Stage 3 is where varieties advance to pre-commercial evaluation. Here varieties are grown in commercial scale plantings and more emphasis is placed on storage, packouts and market acceptance tests. The orchard managers now have more input, communicating regularly with Emmanuel to convey their observations to the R&D team.

On my first day Emmanuel and I work through a Stage 1 orchard of mutants and varieties. Because many of these varieties have already gone through a degree of testing one would expect them to progress easily through to Stage 2. Emmanuel explains that this is not the case as all varieties are subjected to the same testing regime. What is suitable for one country may not necessarily be suitable for France or even the Loire Valley. We see why as we work through some disease resistant varieties from another country. The fruit on one tree is small, russeted and misshapen. Emmanuel mentions that he will accept slightly lower quality standards when testing disease resistant cultivars as there are so few really good ones.

Once Emmanuel has confirmed a variety’s maturity he will do an evaluation as follows: He will look at the tree to rate its growth characteristics, fruitfulness and fruit appearance. Then a taste test is done and eating qualities noted. A global rating is then made on the variety. He then writes it into a register, which directs a harvest team to collect more fruit for storage and further taste tests.

Later in a Stage 2 block we look at the apple variety *Ariane*, which is a true French variety with good disease resistance to apple scab. A quantum leap in terms of the advance of disease resistant varieties, *Ariane* is a little small perhaps, but very attractive with a distinctive bright red and a starburst of white lenticels. It is very good to eat being sweet, snappy and juicy. This variety has progressed through the system and is now being planted widely in France with 40,000 tonnes of expected production. Another variety of interest is *Dalitron*, which was bred by Guy Ligonniere of DL in 1996.



*Dalitron* superficially resembles *Golden Delicious*. French *Golden Delicious* are picked quite green for the UK market and of course the eating quality is diminished by this. The French consumer has gotten used to these green *Golden Delicious* as well, but Guy was keen to change this. *Dalitron* at maturity is quite yellow and flavour at this stage is a pleasant sub-acid with a green banana aftertaste, and with a good texture. Emmanuel says that the storage qualities of this variety are outstanding and DL has high hopes for *Dalitron* as a variety of the future.

### **Dalitron**

Another that DL is progressing is the variety *Dalinbel*, which is a disease resistant *Elstar* type. *Dalinbel* is not quite as tart as *Elstar* and has a firmer flesh. On the downside it is quite russeted which may or may not be a problem for consumer acceptance. With this “antique” apple appearance, DL has directed it’s marketing in a different direction. *Dalinbel* is an apple for Northern Europe consumers who prefer tart apples. DL have pitched *Dalinbel* as “*The apple from your backyard*”, which is a deliberate ploy to older people’s recollections of apples grown at one time in everyone’s garden.

I spent one afternoon with Valerie, who came to IFO from Mondial Fruit Selections. Valerie has a student in tow for the harvest, Benoit. We are moving through the Stage 1 hybrids orchard; in this case it is hybrids from the Valois breeding program. What Valerie and Benoit are tasked with today is very interesting, but at times unenviable. I will explain: As we move through the orchard Valerie is taking notes whilst Benoit is fruit tasting. If the two of them decide that a variety does not meet the requirements for fruitfulness or appearance they will not bother tasting the fruit, just mark the tree for rejection. Only when a tree meets the basic criteria will they do a tasting. The unenviable part comes in the tasting, as many of the fruit are quite inedible. What may pass the appearance test with flying colours may in fact taste terrible. A taster and the note-taker must regularly swap jobs so as to not get numbed to taste. Even so one can do this for a few hours only before getting a stomachache. The interesting part of this job is that there are some varieties of potential and make the testers jobs worthwhile. But as is the case with all breeding program material there are only a few seedlings that progress to the next stage. Even fewer make it to Stage 3. Valerie is very dedicated to this job and quite ruthless when a variety does not make the grade. All IFO seedlings have been grafted onto M9 rootstock to get early fruiting. If within three fruiting seasons a variety is not showing promise they are discarded. Many are discarded before then, if they show obvious undesirable traits such as disease susceptibility.

The following morning I am back in another seedling orchard with Sylvain who is IFO’s chief breeder. Sylvain came to the company via Valois. Today he also has a student helper Aude helping him assess a large block of apple seedlings. They quickly go through looking for maturity by checking background colour and will taste fruit when it

looks mature. Once again if it does not meet basic requirements it is tagged for rejection. If after tasting there is some promise they will harvest a few fruits for further testing. As Sylvain at the front end of trialing he must be especially ruthless in his work. If a tree looks bad, lacks fruitfulness, the fruit odd, misshapen, russeted or otherwise not pleasing to the eye it is rejected out of hand. Another bad character they look for is an open calyx tube in the fruit because of its role in storage rots and this is cause for rejection as well. As we quickly move through this block we are stopping only infrequently as Sylvain checks for trees previously tagged or when a fruit catches his eye. The tasting occurs equally quickly as Sylvain has very set ideas about eating quality. In this I agree with him, as many seedlings are tasteless, soft or at worst inedible. We work all afternoon to complete this block of trees and by the end only have three small samples to show for it.

And so it goes for the IFO team over the entire harvest season and later as storage fruit are gathered together for more tasting and quality tests.

I must extend many thanks to IFO team and particularly Emmanuel for taking time out during their busiest period to show me their operations and methods.

**CTIFL** – I was able to spend sometime with Claude Coureau of the Centre Technique Interprofessionnel des Fruit and Legumes (CTIFL) in the town of St Epain. This is the government research station, which also runs it's own evaluation program for apples and pears. CTIFL have been instrumental in the release of several varieties into the French industry both from it's own breeding program and through thorough and independent testing of a range of varieties. The organisation of CTIFL is such that there are research stations in all of the major growing regions. The La Moriniere Station at St Epain represents the northern Loire Valley. Claude is charged with all the fruit evaluations, which are divided into different stages similar to what is done at IFO. According to Claude there are over one hundred apple and pear varieties in her Stage 1 trials. A variety must prove itself before it progresses to larger scale trials. La Moriniere currently has about 14 varieties in pre-commercial trials. Also like IFO, La Moriniere has it's own packing facility where accurate data about size, colour; blemish and percentage of first grade fruit can be obtained. This data along with any previous orchard observations are added to a database which itself is linked to all CTIFL stations across France. Researchers can then follow and compare data across regional sites. CTIFL researchers can then extract reports from this data and base their variety recommendations based upon their own and nation-wide data.

**Centre de Recherches INRA** – Disease resistance has long been a priority for the INRA breeding program. INRA has many disease resistant cultivars in advanced evaluation on their farm at Beaucouze. They have also made “no-thinning” cultivars where a one fruit per flower cluster character is sought. This character would also help alleviate biennial bearing. The main problem with this is the chance of frost reducing the one fruit per cluster to a no fruit per cluster character! INRA has released the varieties *Florina*®, which is a late, very sweet apple but with not very good storage characteristics and *Baujade*, which is a disease resistant *Granny Smith* type. INRA also teamed up with the Novardi Nursery to release the variety *Ariane* as mentioned before.

**Delbard Nursery** – Delbard is a large private nursery, which runs it's own private breeding program. Delbard is world famous as a nursery and breeder of roses, but it does have a successful pome fruit-breeding program. Its “headliner” is the variety *Tentation*® (translated: Temptation) that is a high quality Golden Delicious type with an attractive

orange blush. *Tentation*® is a club variety with controlled production and marketing. Other variety releases from Delbard include *Jubilee*® and *Delbarestivale*®, which is an early, small but excellent eating apple much planted in Germany.

**Variety release in France** – There would appear to be no organized system of variety release in France. Variety choice is still very much in the grower's hands. CTIFL provides the growers with detailed information from which a grower must base his choice. IFO really bases its variety information upon making sure the product they sell is right for their customers; in simple terms IFO makes sure through thorough testing that a variety they promote and sell lives up to expectations. The other major nursery, Delbard, repeats this approach. French growers have a wide choice of varieties most of which are freely available from the three big nurseries. The emergence of several club varieties in France is changing this situation where free access by growers to these varieties is limited.

**The year 2004** has been a particularly difficult one for French growers with in many cases fruit sold for less than the cost of production. A high portion of France's crop is *Golden Delicious* and this variety in particular has been hard hit by low prices. As a result there is a lot of interest in new varieties many of which are club varieties. Club varieties are those varieties that are proprietary (solely owned) with limited production and targeted marketing. The club variety *Jazz*® has achieved very good returns to growers though with only limited production at this stage. Most French growers have reservations about club varieties, but believe that economics are forcing them to seriously consider growing them.

## Italy

In Italy I base myself in the South Tyrol region of the north of that country. This is the largest area of contiguous apple production in Europe. The region has 17,000 hectares of apples, which produce around 900,000 tonnes of fruit. Interestingly, Australia has almost the same area under production, but only manages around 300,000 tonnes of production. So we can see there is much to be learned on production methods alone. This region also has 85% of its crop marketed cooperatively and only the remaining amount marketed privately. There are also 9200 producers in this region with an average holding of 1.8 hectares. The average needed to support a fulltime orchardist was thought to be in the region of 6 – 8 hectares. These figures do not include statistics for the Trentino Province, which abuts the South Tyrol Province. Trentino produces 300,000 tonnes of apples from about 5200 producers.

Both these regions have a heavy reliance on the variety *Golden Delicious* and it makes up about 70% of production overall. While this may seem to be over reliance on a single variety there are high altitude areas in both regions that do grow this variety very well and it has excellent market acceptance. Even so in some of the areas where high quality *Golden Delicious* production is harder to achieve growers are searching for better alternatives. Much fruit breeding effort has been placed in finding a better *Golden Delicious*, one that retains the Golden's good eating qualities with a better red blush. The red blush being a highly desirable characteristic in Italy (undesirable to ignorant Australian marketers) Interesting too, is that this area is one of the few in the world where *Red Delicious* is being planted. This variety is much sought after by the Italian market

and achieves good returns. Other odd varieties like *Rome Beauty* also achieve good returns through low production costs and limited production.

The topography of the apple production regions in the South Tyrol and Trentino provinces is divided clearly into the low valley regions and the high valley regions. The low valley may be only 200 meters above sea level and the high regions as much as 900 meters. The low valleys have hotter summers, milder winters, more rainfall and longer growing seasons. The high valleys have milder summers, colder winters, less rainfall and relatively short growing seasons. The differences in growing conditions are favourable for different apple varieties. As mentioned before favourable *Golden Delicious* production is particular to the high valleys. The cool summers and low humidity produce a fruit free of blemish with an attractive red blush so favoured by Italian consumers. Red blushed fruit from these high valleys achieve a 40% premium on the market over other *Golden Delicious*. The low valleys with their longer growing seasons can grow a wider range of varieties and the South Tyrol has the most extensive plantings of the Australian late season variety Cripps Pink (*Pink Lady*™).

The South Tyrol province enjoys autonomous government within Italy. For four weeks I work out of the Laimburg Research Station, which is some 20 kilometers to the south of Bolzano. The province fund Laimburg and research is divided between fruit, vines and mountain agriculture (mostly grazing on summer pastures). My interest was fruit and in the South Tyrol that means apples. Laimburg runs a wide range of research projects around apple production. These include:

- Comparison of new varieties with and without disease resistance from the breeding programs of the most important apple-producing countries.
- Research in maintaining healthy and valuable pomological material for the propagation of certified young trees.
- Research in floral biology and evaluation of appropriate pollinators.
- Breeding of new varieties with optimal intrinsic qualities and market-oriented characteristics.
- Use of new methods (molecular biology) to shorten the breeding process.
- Evaluation of new apple rootstocks.



Of particular interest to me was the apple breeding program and the variety evaluation program. Walter Guerra heads up both these programs and it is with him that I spend most of my time.

**Looking south towards Laimburg an overview of the Etsch Valley in the South Tyrol.**

The breeding program has a focus on providing new locally bred varieties

that will give local producers differentiation in the marketplace. Walter is the breeder and has used well-known quality parents in the breeding lines. This breeding program is producing several thousand seedlings a year. The seedlings are planted on dwarfing and precocious rootstocks in order to get early cropping and subsequently early evaluation of fruit. As with most breeding programs many seedlings are needed and very few of the seedlings show fruit of any promise. There are over 14,000 seedlings in evaluation. The first stage of breeding is to cull out the seedlings of no interest. To do this Walter moves quickly through the seedling orchard tasting fruit where it appears ripe. Fruit of interest are tagged, noted and samples taken. Laimburg employs a standard assessment sheet fruit for both breeding program fruit and fruit from other outside sources. The assessment sheet notes pomological traits of the fruit, general appearance and a global note (ranking). This hard copy assessment is then entered into a database that Laimburg have developed. The database provides a very comprehensive array of variety data that has been built up by the research program for use mainly as a reference. After the required two months of storage all research fruit is taste tested by a tasting panel made up of staff and faculty. A healthy cross-section of people is selected for this task incorporating different ages and sexes. Peeling and slicing prepare the fruit samples. These are then tasted blind and panel members fill out a sheet, which records firmness and taste; ratings range from very bad to very good. After the tasting samples of whole fruit are rated for appearance by panel members. Here there was a wide range of opinion on what an attractive apples was, suggesting that the marketplace has wide scope for different varieties.

The variety evaluation program is extensive with numerous varieties in different stages of testing. To get good regional data research sites are to be found in both the high and low valleys. The evaluation itself is separated into Stages 1, 2 & 3.

All varieties must go through Stage 1, because here the wheat is sorted from the chaff so to speak. Stage 1 gives a snap shot view of a varieties suitability for the region. The same assessment sheets are used, but fewer trees are used and less in-depth tests are carried out than later Stage testing. Because the South Tyrol is such a major growing region many variety owners are keen to see their variety planted in the region and Laimburg usually has no trouble accessing varieties for testing. Testing agreements are required for proprietary varieties and restrict propagation and growing for research purposes only. Within the Stage 1 sites there are varieties accessed from outside Laimburg and also varieties from their own breeding program. Over a hundred varieties are in Stage 1 testing. More promising varieties are moved through to Stage 2.

Stage 2 testing requires a more thorough testing as now, varieties, which have shown promise in Stage 1, are planted in larger numbers. Testing looks at cultural difficulties, storagability and varieties of common knowledge are used for comparison purposes. Testing here also takes on a more scientific approach with replication required and analysis of all aspects of fruit external and internal characteristics. The difference between the two sub-regions is quite marked at this stage of research. For a variety to progress through to Stage 3 it must have shown itself to be as good as or better than current commercial varieties in at least some of it's characters.

In Stage 3 pre-commercial trials are carried out with large commercial scale plantings (1ha +) taking place. By this stage the variety is well known to the researchers, but its performance on a commercial scale must be carried out. Assessments of cropping potential, thinning and cultural requirements are all important. Here too, the Laimburg

orchard managers play an important role, supplying the researchers with practical and pragmatic views on the variety that they are now managing.

After this long process, which takes many years the researchers publish their assessments of variety performance. Recommendations are made generally through SK SudTirol Variety Innovation Consortium, which is the variety management and marketing arm of the two main Cooperative Groups in the South Tyrol. 85% of all apples grown in the South Tyrol are marketed through the Cooperatives of VIP and VOG. VIP represents growers in the upper Vinschgau Valley and VOG growers of the lower Etsch Valley. It is SK SudTirol's job to promote new varieties and direct growers to the varieties through the Cooperative groups, based on Laimburg's recommendations. This way a more organized approach can be taken to decide which varieties growers should plant, where in the region and in what numbers to achieve critical mass of production. An organized approach to developing a marketing plan can also be achieved by the close cooperation of VIP and VOG through SK SudTirol. The decision to run with a variety ultimately lies with the grower, but with direction from the Coop one can make such a decision with more confidence. Laimburg's direct contact with the growers is minimal when it comes to variety research, though field days are conducted every year where growers are invited to come along, view and taste varieties that are in testing. In the case of mutants (strains) of commercial varieties, growers may use Laimburg's published assessments for variety selection for small gains in productivity, fruit quality or colour development.

The database used in Laimburg's variety evaluation is comprehensive and provides a wide range of data on variety performance. It uses a scientific approach to variety testing and provides the researchers with an accurate insight into a variety's pomological traits and commercial potential. In particular storage testing is very thorough and through this a detailed variety management plan can be built up prior to a variety's release to industry. The use of standard hard copy assessment forms provides consistent and replicable data. It also uses Excel spreadsheets managed under an Access program, which is easily used and commonly recognised. Laimburg has built up a massive amount of variety data that the researchers can access and from it produce detailed reports.

Laimburg retains clear independence in its variety evaluation program and delivers its reports without fear or favour. This is reflected in its reports, which present varieties warts and all, including many high profile heavily promoted varieties.

**San Michele** – A mere 35kms to the south of Laimburg, but in the next province of Trento is the Istituto Agrario di San Michele (ISMAA). As an indication of the autonomous nature of the provincial governments, research projects at San Michele are often similar to what occurs at Laimburg. San Michele is smaller than Laimburg but has more emphasis on microbiology research. San Michele has a small apple breeding program with similar objectives to the one at Laimburg, but using non-traditional methods to achieve their desired outcomes. The main research topics at San Michele are:

- DNA microarrays
- Structural genomics
- Innovative technology
- Markers and Maps development
- QTL Mapping
- Marker assisted breeding

- In vitro culture
- Plant-pathogen interaction
- Functional genomics & proteomics

Main genomic projects of the department:

- Development and application of molecular markers to breeding of quality and resistance to pathogens in apple, grape and berries by:
  1. Genetic mapping and phenotyping
  2. Development of genomic tools to improve breeding
  3. Bioinformatics facilities
- Analysis of cell metabolism during biotic and abiotic stress by:
  1. Gene isolation and characterisation
  2. Gene to gene interaction
  3. Stable and transient transformation

The visit to San Michele provided an insight into some of the more cutting edge methods of fruit variety breeding and the opportunities that these technologies provide, particularly in the development of disease resistance of new varieties.

**Instituto Sperimentale di Frutticoltura (ISF)** – This is a branch of the nationally funded research stations and based in the city of Trento. It has yet another breeding program situated very close to the previous two. It has the objectives of high quality, disease resistance with an extra emphasis on tree habit. There are about 1220 cultivars from all over the world present in the varietal trials at ISF. About 200 have been extensively used within the program for crosses. Over 70,000 seedlings have been produced from 1974. All seedlings are evaluated for resistance to apple scab, powdery mildew and other diseases, as well as for quality traits. The current program consists of importing and re-selection, phenotypic recurrent selection and back crossing.

Seven scab varieties have been released from ISF and several selections are still under evaluation for commercial trials. All of them are scab resistant and some of them also show resistance to powdery mildew and fire blight. For breeding lines ISF has used Red and Golden Delicious extensively for high quality parents and various disease resistant American cultivars. Major objectives of the ISF breeding program are to introduce into the gene pool resistance traits to the apple pathogens, *Venturia inaequalis* (Apple Scab), *Podosphaera leucotrica* (Powdery Mildew), *Nectria galligena* (European Canker), *Phytophthora spp.*, *Erwinia amylovora* (Fire Blight), *Eriosoma lanigerum* (Woolly Apple Aphid) and *Dysaphis plantaginea* (Rosy Apple Aphid). Equally important is the transfer of desirable characters conferring quality, namely, shape of the fruit, crispness and good storage performance. Selection for precocity and for different growth habits is also considered.

The most notable varieties released by ISF are *Brina*, and *Golden Orange*, both disease resistant of moderate vigour and high productivity.

**Bologna** - I also have the opportunity to visit the University of Bologna in the Province of Romagna. Here is another apple breeding program with a strong emphasis on disease resistance. The principle breeder is Professor Silverio Sansavini. The University of Bologna program is somewhat infamous for breeding a transgenic (GM) Gala apple. Whilst this project is considered an international success it has foundered in the politics of anti-GMO and is now on ice. The program at Bologna has achieved some success with traditional breeding with the release of the disease resistant variety *Prime Red*, and the

non-disease resistant variety *Gold Chief*. Both these varieties have not yet met with commercial success but show much promise. *Gold Chief* also has the added benefit of being easy to train with a marked spurring growth habit.

**Ferrara** – I was able to visit the breeding and evaluation program run by Consorzio Italiano Vivaisti (CIV) in Ferrara, which is to the northeast of Bologna. CIV is a variety development company made up of three leading nurseries in Italy. CIV breeding program itself focuses on fruit trees and strawberry plants. The activities of CIV are:

- Production of certified budwood, rootstocks and mother plants within the framework of the National Certification scheme.
- Providing new improved varieties of temperate fruits and strawberry. This goal is achieved in three ways:
  1. Introducing new varieties from different breeding programmes, testing them and getting licenses for propagation.
  2. Participating in outside breeding programmes through agreements with the principles. CIV has agreements with the HRI program in England and the Summerland program in Canada.
  3. In-house breeding programmes. For this CIV has about 20 hectares of seedling orchards.

The CIV breeding programmes are as follows:

Apples (Started 1988)

- 3000 – 5000 seedlings a year.
- 2 varieties released.
- Several advanced selections in extensive trials.

Pears

- Crosses made in 1988 and 2000.
- 2 advanced selections in trial from those crosses.

Peaches/Nectarines

- 2000 – 3000 seedlings a year.
- 11 varieties released.
- Several advanced selections in extensive trials.

Apple rootstocks

- Some genotypes ranging from M27 to MM106 size, selected among seedling populations of different origin are under evaluation.

Pear rootstocks

- A population of *Pyrus communis* seedlings was screened to find rootstocks that would be easy to propagate by either layering or cuttings.
- Selected for vigour characteristics similar to that of quince.

**Cripps Pink x Coop 25 selections.**



- 8 selections are actually under further evaluation.

CIV has been successful in releasing and patenting several stone fruit and strawberry cultivars. In apples they have released the variety Rubens® to industry in 2001 and the disease resistant variety *Modi*® in 2004, both from their own breeding program. From their selection trials they have released improved clones of *Gala* and *Fuji* apples. Very interesting to Australians is their crossing of *Cripps Pink* with the disease resistant cultivar *Coop 25*. This has resulted in the 7 advanced selections of apples resembling *Cripps Pink* (*Pink Lady*®) and incorporating disease resistance.

**Corzano** – The Konsortium Suid Tirol Baumschule (KSB). Most of the pome fruit nurseries of the South Tyrol have formed a company KSB to oversee the production and promotion of Certified Virus-free propagation material. Virus-free propagation material is essential in modern orchards as it gives better production, healthier trees and fruit less blemished. Unfortunately, Australia has no virus-free material available to our growers, putting us well behind world's best practice.

I visited the KSB budwood orchard at Corzano on two occasions. Corzano was chosen as a site for the orchard not only for its good soils and water, but also most importantly for its isolation from major areas of pome fruit production. A 5 km buffer from commercial fruit production is required and even fruit trees in backyards are monitored and removed if required. The site is managed by KSB, but the trueness to type selection and virus testing is done independently and monitored by the South Tyrol Provincial government. Pomologists from the Laimburg Research Centre (who are technically public servants) do this independent “auditing” of the system. I participated in the trueness to type selection process with Laimburg pomologists.

The budwood mother trees are visually inspected at harvest time for pomological traits that define trueness to type. These are tree appearance and health; fruit colour, shape and uniformity. The process uses a rating system with the numbers 0, 3, 5, and 8. The rating results are used to identify trees from which budwood can be taken and a brief explanation is as follows:

- 0 – When a tree is rated 0, no budwood can be used at all from this tree and the tree should be removed from the propagation orchard.
- 3 – No budwood can be taken from a tree rated 3, but the tree will be inspected the following year. If a tree rates 3 for 3 years in a row, it must be removed from the propagation orchard.
- 5 – A tree rated 5 meets minimum requirements for propagation and can be used for producing nursery trees only.
- 8 – A tree rated 8 meets all the requirements for trueness to type and can be used for producing nursery trees and reestablishment of budwood mother trees.

When one of the inspectors views each tree they are looking for “typical” characters of the variety and depending on the presence or absence of these characters rates the tree for its propagation potential. A tree must have a minimum of 6 fruits otherwise it is immediately rated 3 as trueness to type always includes fruit characters. If a tree has enough fruit the inspector will look closely at the fruit to see if it has the right level and type of colour, the right shape and no aberrant characters. If it fails in any of these it is rated 0. A tree with fruit that show only insufficient colour would probably be rated 3. A tree that meets the minimum requirements, but displays some character that the inspector considers less than ideal, such as the presence of a chimera, it would be rated 5. A tree

meeting all the ideal varietal requirements is rated 8. Three people complete the inspector's team. Firstly there is note-taker who writes down the ratings called out by the actual pomologists. The note taker also carries a spreadsheet that includes all the ratings



for previous seasons, which can also impact on a tree's selection. Secondly, the pomologist who does the actual rating calls out those ratings for the other two people to hear. The pomologist may also use the opinions of the other two in the team when not completely sure. This is especially true of there is a shady side to the tree and to overcome this the note-taker views that side. The last person in the team is the painter who paints the trunks of the trees rated either 5 or 8 and suitable for propagation. Trees rated 0 or 3 are left unpainted and easily identified as unsuitable for propagation.

#### **Pomologists inspecting trees for select budwood.**

Using this system the South Tyrol nurseries produce very consistent, high quality trees without the levels of reversion from

type that is so prevalent in Australia. I saw similar and thorough systems of budwood selection in other European nurseries though not all were audited independently.

**FENO** – Apart from KSB there is one other nursery group in the South Tyrol. The FENO group is made up of seven nurseries that split from KSB group. FENO run a small breeding program, which is interesting because it uses a local variety as a parent to include not only local character but also local adaptability. FENO variety development relies heavily on local selection of clones from commonly grown varieties; from this they have the varieties, *Goldrosio Golden Delicious*, *Brawori Braeburn*, *Fukan Fuji*, *Redkan Red Delicious* and *Decarli Gala*, all of which were sourced from South Tyrol orchards.

FENO also do their own budwood propagation and like the KSB theirs is audited and selection done independently to provide Certified material.

**The South Tyrol** provincial government manages the Certification system that both KSB and FENO adhere to. They not only monitor the heat treatment processes required for eliminating virus, but also coordinate the audits and ensure the material is maintained in controlled production areas. It also distributes the "Certified Virus-free" tree tags to the associated nurseries, as they are required. Each and every nursery tree produced under the

“Sud Tirol – Alto Adige Certified” system gets a tag. This tag (called a plant passport) not only guarantees virus freedom, but also trueness to type (see picture below).

**Gruber Nursery** – Gruber Nursery is based at Lana in the South Tyrol province, but like all South Tyrol nurseries has its production base outside the region in order to meet buffer zone regulations. Gruber have 100 ha of production fields in Roverchiara near Verona, and of this 95% are apple nursery trees. Their production of finished trees is 700,000 per year. Most of these are on M9 (fully dwarfing) rootstock and grown in the Knip Baum (2 year old) style. Gruber grow the Swiss variety *Mairac*® under license and this was a significant portion of their 2005 production. The remarkable thing for an Australian visitor to the fields was the quality and uniformity of the young trees. A combination of virus freedom, good soils and attention to detail produced trees of exceptional size and health. Walking through a patch of 200,000 trees all nearly 2 meters in height with numerous feathers (branches) was an impressive sight. In Italy a big tree with at least 8 feathers is preferred and expected, but most of these had at least 12 and sometimes 16 feathers! To get a tree of this type takes effort, technical detail and excellent growing conditions. Surprisingly, even after this effort these trees are not expensive when compared to Australian nursery trees at around \$7.50 AUD.



**National Certification System** – There is no national certification system for nursery tree production in Italy. The major nursery groups use their own system of proving trees that are certified virus free and true to type. The Italian national government is setting about changing this and there is presently a working group commissioned to facilitate adoption of an Italian nursery tree certification system for all nursery production. The system will adopt a similar approach to what is already done in the South Tyrol.

## Germany

Germany has a number of small breeding programs of which I was able to visit a few. Here again there is a strong emphasis for disease resistance breeding. This probably reflects the degree of difficulty in growing fruit in the humid climate of Germany, a strong environmental movement and a desire to reduce the costs of pesticide use. Even so, here where ecological awareness is notable and integrated and organic production systems well developed, disease resistant apples account for no more than 5 – 6 % of the

market. So market penetration and acceptance of these disease resistant varieties has not yet eventuated. The breeding of disease resistance must have high quality, long storage and tree habit objectives as well to ensure market acceptance. Disease resistant varieties of apple are difficult to breed traditionally because the disease resistant genes come often from crabapple ancestry. Breeding out the crabapple astringency and rank growth habits, whilst retaining the resistant qualities is a long and convoluted process. The biggest breeding programs in Germany are at University of Hohenheim, the Geisenheim Research Institute and the Federal Research Centre for Horticultural Plant Breeding at Ahrensburg.

**University of Hohenheim** – The small breeding program here under Prof, Jens Wunsche has released been very successful in the breeding of prune plums. It has projects in using DNA fingerprinting and molecular markers to assist breeding of stone and pome fruits. Jens also has an extensive variety collection and small evaluation program.

**Geisenheim Research Institute** – The Geisenheim Research Institute has been instrumental in the breeding of the compact ornamental apple types and have released several including Ginover® and Lancelot®. These compact flowering apples have been a worldwide success and have given impetus to other areas of fruit breeding at Geisenheim. They also have had success in pear breeding releasing the varieties Scone Helene® and Superior® both of which are yet to achieve commercial success.

**Ahrensburg Federal Research Centre for Horticultural Plant Breeding** – Following the closure of the Max Planck Institute breeding program at Köln-Vogelsang and the Fruit Experiment Station, Jork, the Federal Centre for Horticultural Plant Breeding was established at Ahrensburg. New breeding objectives were set up and experiments were started on these lines.

1. High quality apple cultivars with resistance to scab, mildew and Nectria canker.
2. High quality sour cherry varieties with good size and mechanical harvest potential.
3. Dwarfing rootstocks for sweet cherries in cooperation with the Pomological Institute of Giessen University.
4. The final selection of apple and pear rootstocks that is uniform, through seed and apomixes (asexual propagation).

From this program many disease resistant varieties have been released including *Reanda*, *Rebella*, *Regine*, *Reno* and *Rwena*. *Rebella* and *Regine* show resistance to apple scab, powdery mildew and fire blight. Its research into rootstocks has resulted in the *Supporter* series of dwarfing apple rootstocks of which some commercial success has been achieved. Pear rootstocks are in advanced testing and show the rootstocks are easy to propagate in stoolbeds, are more frost resistant against winter frost than quince rootstocks and have growing capacity that is intermediate between quince and seedling. They can be propagated by green cuttings and in vitro. Compatibility is satisfactory and fruit quality of cultivars on these rootstocks is similar to quince. The development of dwarfing rootstocks for sweet cherries done in cooperation with the Pomological Institute of Giessen University has resulted in the commercial success of the Gisela 5 and 6 rootstocks. Other releases have not met with the same level of commercial success, but breeding continues to meet objectives of dwarfing, winter hardiness and compatibility.

**Schneider Baumschulen – Obstbau** – This is a nursery owned by Georg Schneider near Heidelberg on the banks of the Neckar River. Georg has 2 ha of nursery, 20 hectares of orchard and an extensive collection of fruit varieties, which he actively evaluates. Fully diversified, Georg has apples, pears and plums in production and also has a farm market selling fresh fruit, fruit juice and schnaps. Georg is a nurseryman who likes to keep well abreast of developments in the variety game. He also has a good report with growers and through his own evaluation is able to pass on variety information directly. In the small evaluation program there are over one hundred fruit varieties. This is a private program, which Georg runs for his own interest and that of his customers. Georg uses basic observations and over the years has built a large body of information on variety performance in his region. Without being scientific it provides him with basic varietal cultural requirement information. The Schneider Nursery is a member of the Artus Group, which helps him access varieties otherwise unavailable to smaller nurseries.

**Artus Group** – The Artus Group based in the town of Karlsruhe is a company whose main area of expertise lays in acquiring fruit cultivars. It represents a number of German fruit tree nurseries. In addition to the cultivation and management of new varieties they also aim, through selective marketing, to promote the demand for and consequently the total sales of new fruit varieties. They work closely together with breeding institutions



within Germany and abroad to take part in and influence new developments in the area of fruit tree cultivation. The Artus Group also allows interested propagators to obtain sublicenses for new cultivars. From the German breeding programs, the Artus Group has obtained the apple varieties *Ahra*®, *Ahrina*®, *Gerlinde*®, the pear varieties, *Schone Helene*®, *Superior*® and a whole raft of plum varieties.

**Ahrina**®

**Variety adoption in Germany** – Variety choice in Germany is still very much in the hands of the grower as while Cooperative marketing is still a dominant factor, the actual Coop's do not dictate variety choice as in the South Tyrol. Variety choice is very much dependent on supply and demand forces of the mega supermarkets of Germany. These mega supermarkets are not averse to sourcing fruit from all corners of the world and while German-owned show no preference or obligation to buy German fruit. The price squeeze imposed on German growers has most planting only modern varieties. There is a desire to adopt club varieties, but economies of scale make marketing through the Cooperatives difficult. Also the mega supermarkets are also so price driven there is some doubt to whether they will make room for expensive club varieties.

**Cooperative marketing** – visits where made to various fruit packing cooperatives that sell under the umbrella of Obst vom Bodensee, which is a company set up to manage all of the marketing for Bodensee fruit. Obst vom Bodensee is an established brand in the German marketplace, which makes much of the Bodensee region's beauty and tourist appeal. They hope that the many of the tourists who have visited the region from other parts of Germany recognise the brand when in their home supermarket. Obst vom Bodensee also provides technical information back to the growers through the

organisation MABO, but does not provide variety recommendations. With the Cooperative system the grower supplies the fruit and then his contact with it is lost as it enters the pool system. How and when the fruit is market is very much decided by the marketing organisation. With this system there is little incentive to try anything new other than clones of already established varieties. For a variety to reach critical mass it needs a groundswell of support from the growers and for the marketers to agree to try to sell it. So you can see this system is cumbersome and variety change is very slow. As with the rest of Europe grower returns are very low, but even so growers are reluctant to plant varieties that will not find a place in the Cooperative system.

**Roadside marketing** - In most regions of Germany there is significant presence of developed direct marketing (roadside), which require a different mix of varieties than is needed by the big Coop's and supermarkets. So a grower has a choice to select "modern" industrial varieties required for Coop marketing or more traditional varieties for roadside marketing. It is a different customer that buys their fruit from roadside markets. They are more discerning, often-paying more for fruit than they would if they bought in supermarkets. The traditional varieties whilst not always old varieties are often more flavourful, less well coloured and at the acid end of the taste scale. These apples are often termed "antique" and enjoy strong following in roadside markets. A good example is the variety, *Elstar*. *Elstar* is giving growers poor returns through the Coop's yet at the Obsthof Strodel (see below) this was by far their best seller with over 60% of fresh apple sales.

**Obsthof Strodel** - I visited the Obsthof Strodel in the lead up to Christmas. This is a very large and successful roadside market situated just outside the town of Lindau. I met with Klaus Strodel and we were able discuss at length their marketing strategies and variety mix. They grow apples, pears, strawberries, cherries, asparagus, pumpkins and Christmas trees. Along with fresh produce they also sell fruit juice, wine, schnaps and jams. They run seasonal festivals for harvest and Weihnacht (Xmas). The Strodel's run a very professional roadside store, website and online purchasing. A good portion of their crop is sold through the shop at prices that are higher than supermarkets. They sell 15 varieties of apple, 4 varieties of pear, 6 varieties of strawberry and 8 varieties of cherry. They also sell minor fruits and vegetables some of which are sourced off farm. This displays the scope that is available to direct marketers, which is not available to growers supplying supermarkets. Klaus is very forward in trying new methods of selling product. His latest thing is using laser technology to etch his brand on apples for sale, which unlike stickers on the fruit skin can be eaten readily. There are many roadside markets in southern Germany and a very considerable quantity of the German fruit crop is sold this way.



## **Conclusions:**

### ○ EUROPE GENERALLY

- Disease resistance breeding is the single strongest motivation for pome fruit breeding programs in Europe.
- Many promising disease resistant cultivars, but none yet ready to seriously challenge conventional varieties in the market place.
- Surprisingly, the European organic industry is not adopting disease resistant varieties to any great extent.
- With so many high quality non-disease resistant cultivars in the industry, a disease resistant cultivar that is equal to or superior to those is the “Holy Grail” of apple and pear breeding.
- Much replication of breeding objectives, but because numbers of seedlings are so important, this may provide best chance for successful variety development at least somewhere.
- This replication may cause governments to rationalize where their funds are involved.
- Very many orchardists in Europe are getting by with roadside marketing, agro-tourism and alternative crops in this time of low prices.
- Breeding programs must graft their seedlings to fully dwarfing (M9) rootstocks obtain fruit for assessment as soon as possible.
- Nursery tree quality may not be directly related to varietal success, but early production is. Therefore nursery tree quality, which affects precocity, is very important to grower returns. European nursery trees are far superior to Australian nursery trees and cheaper.

### ○ FRANCE

- Variety evaluation must be independent of commercial pressure.
- Variety evaluation techniques must maintain consistency for several years to paint a truer picture of variety performance.
- A variety really does require thorough testing in all areas where that it is intended to be grown. Trying to fast track a variety is fraught with danger. There are simply too many variables dictated by climate that impact upon achieving a high quality product.
- Keep testing procedures simple. Highly scientific approach cannot replace good observations and simple objective measures of performance.
- Keeping testing procedures simple produces earlier results – variety performance should be quickly ascertained.
- Maintain evaluation trees in optimal condition to produce faster and more valid results.
- Training of observers important to maintain objectivity and procedural consistency.
- Club varieties not yet developed enough to provide answers to industry malaise. Their tiny portion of production provides profit for a tiny portion of the industry. Even so growers must be open to opportunities to sell on novelty and exclusivity.

- Club varieties must have broader scale to have significant benefit to the general industry.
  - Search continues for really unique varieties that may provide spark to industry.
  - Over reliance on a single variety (no matter how well it's grown) leaves the entire industry enslaved to supply and demand forces.
- ITALY
- Improved strains of established varieties provide ready access to markets on the back of the “parent” variety but cannot provide fresh impetus to a flagging market.
  - Improved strains of established varieties provide growers with improved packouts and increases in profit margins, but this advantage becomes marginal when that strain becomes the standard or over production occurs.
  - New varieties can provide fresh impetus to markets, but must be backed up by strong marketing and sufficient production to provide wide benefit to industry.
  - Cooperative marketing provides coordination for large quantities of fruit and perhaps leverage against the mega supermarkets, but when on an area wide scale it is cumbersome in adopting new varieties and new marketing approaches.
  - Cooperative marketing allows individual growers hardly any latitude with variety choice, and no connection with the end consumer.
  - Identify market need before tailoring variety choice to meet it.
  - GM breeding still meeting strong public resistance even with obvious potential benefits.
  - Breeding programs need long funding and personnel commitment for success. Modern governments often lack the required same commitment.
  - Utilise your obvious growing advantages where climate is involved and select varieties to match those advantages.
- GERMANY
- Rationalisation of breeding programs is not always bad, especially where similar objectives occur between programs. Regional breeding need not occur. What is important is regional evaluation of selections!
  - Growers must be open to possibilities for sale of all varieties, some of which might not be new.
  - Growers must be open to *all* marketing opportunities present in fruit growing and gear their properties and businesses for flexibility.
  - Growers must remain connected to the consumer in some way.
  - Supermarket dominance of retail sales is industrialising apple production. The varieties that suit this industrialisation will not easily be changed.
  - Exceptional qualities and/or benefits will have to be exhibited by a new variety in order for it to impact significantly on the marketplace.
  - There are many good varieties in the industry, but few are have good marketing. A good variety is one, which provides ongoing profit to the grower and not necessarily one, which has generalised “qualities”.

## **Recommendations:**

- Variety development in Australia severely impeded by poor budwood selection and poor monitoring of budwood orchards.
- While now in progress, Australia sorely needs a Certification system that guarantees virus freedom and trueness to type.
- These two points above if implemented would provide the single biggest boost to variety development in Australia.
- Nursery tree quality must be improved in Australia, incorporating good budwood selection and Certified material.
- Disease resistant varieties very important to the future of the industry and many exciting developments in this area.
- Fruit breeding with local objectives only is not practical with breeding programs searching for outside funding. Fruit breeding should adopt objectives for general good and let regional evaluation provide answers for local outcomes.
- Close cooperation between breeding programs, nurseries, variety owners and regional evaluation required for independent testing of new varieties.
- Any regional evaluation must be independent as not only are nurseries and variety owners not independent, but also breeding programs that must justify their funding by promoting their own varieties.
- Regional evaluation must stand-alone, have universal acceptance as necessary and provide information that is needed primarily by growers who are the core of the industry.
- Regional evaluation of new varieties essential for quality production and as margins get tighter, economic production.
- Growers should explore other avenues for sales of the varieties they now have. New variety development is too slow and will continue to be too slow to provide immediate benefit.
- There may be some benefit in “looking backward” to old varieties and reinventing their marketing.
- When looking at club varieties a grower should look more closely at the actual club than at the variety. Most club varieties are sound, but it is the marketing plan and financial situation of the club that is most important.
- Club varieties by their nature will only provide growers with an outlet for a small portion of their total crop. What will growers do with the rest of that total crop?
- Because Australia’s evaluation program does no breeding it must consider itself the equivalent of Stage 2 testing in European programs and as such should provide in-depth testing of multiples of trees and be able to clearly show regional differences.
- For Australia’s evaluation program to provide pre-commercial trials and therefore commercial recommendations seriously risks damaging its independent status.
- Australia must be able to differentiate itself in the market with its own varieties or varieties that very much suit its growing conditions.