

fruitgrower

A U S T R A L I A N

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Growing your market: Getting the harvest right

Saving apple storage costs
Adjusting irrigation for canopy size saves water

THE OFFICIAL MAGAZINE FOR APPLE, PEAR AND SUMMERFRUIT GROWERS IN AUSTRALIA

Australian Fruitgrower
 Australian Apple and Pear Ltd (APAL) and Summerfruit Australia Ltd (SAL) are the peak industry bodies representing the interests of commercial apple, pear and Summerfruit growers in Australia in matters of national importance including regulation, legislation, marketing, research and development.

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Editorial

What a start to the year! With the exception of WA an unseasonably wet late spring-early summer merely preceded even more unusually high rainfall and floods across large areas of eastern Australia. From Rockhampton to Tasmania a water surplus – not a shortage – was the problem. At the time of writing the issues continued while recovery was being hampered in some places by even more heavy rain. The direct effects of rain and flood aside, the indirect impacts on prices through logistics and supply and demand factors could be significant. Effects on fruit quality this season are another matter.

This is not to say good use of water should be forgotten. In this issue Lexie McClymont and Ian Goodwin of DPI Victoria report on adjusting irrigation for canopy size to save water and maintain production.

Meanwhile the International Energy Agency estimates that global demand for energy will increase by about 50 per cent by 2030 while the German Advisory Council on Global Change points out that, in the same timeframe, carbon dioxide emissions worldwide must be halved if global warming is to be limited to 2°C by the end of the century. So it is highly relevant to consider Dr Gordon Brown's focus this month on the sharp rise in electricity costs experienced in many regions recently and his summary of some options for reducing the costs of running coldrooms.

So, growing fruit is even more closely tied to environment, climate and economics. This is why we're nowadays taking our growing cues from places like northern Italy. In this issue John Wilkie explains the evolution of today's advancements in growing systems in response to rapidly rising land values. Consider the figures. No wonder there is always another level to take things to.



John Fitzsimmons
 Editor

Cheers
John Fitzsimmons



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 Technical Editor SAL



Dr Gordon Brown
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Our cover:

A sign of the season – pears in water at Shepparton East, 12 December 2010.



Submission to AgVet Chemical Review

APAL's industry services manager, Annie Farrow, prepared a submission to the Department of Agriculture, Fisheries and Forestry's (DAFF) policy discussion paper 'Better regulation of agricultural and veterinary chemicals'.

The submission stated that APAL is fully supportive of measures to improve the efficiency and effectiveness of agricultural chemical regulation as it is important that reforms are made to cut unnecessary red tape and to provide farmers with access to cheaper, modern, cleaner and safer chemicals.

APAL raised a number of issues of concern, including that the reforms have been developed without taking account of the requirements of end-users of agvet chemicals, namely Australian farmers and growers. It is important that the reforms include the promotion of a sustainable and profitable agricultural sector as a key objective.

The submission identifies eight issues that need to be considered. The full three page- document, along with other submissions, can be viewed at <http://www.daff.gov.au/agriculture-food/food/regulation-safety/ag-vet-chemicals/better-regulation-of-ag-vet-chemicals>

APAL eNews – be on the list

During December and January, APAL emailed at least 10 APAL eNews to its extensive grower and industry email list. Most of the emails provided the latest information on the arrival of Chinese apples, often on the very day the information was received by APAL.

We were also able to distribute the APAL media release on Chinese apple imports to growers before it went to the media (with an embargo on its release), so growers heard the news first from APAL and not first from the media.

APAL eNews can distribute information and communicate with growers in a flexible and very timely manner and has become a very important communications tool for the industry.

However, we are aware that there are many growers and industry people who are not on the list. Please, if you do not get APAL eNews (it has the banner above in the email) contact the APAL office by either phoning (03) 9329 3511 or emailing Lauri at applenpear@apal.org.au so your email address can be added to the list.

Diversity at APAL

APAL manages a diverse range of inquires from the public and businesses but the following was amongst the more interesting. A phone call was received from Catering Services at Tullamarine Airport investigating a complaint from Emirates Airlines saying they could not use Australian apples in their catering because of a white film that forms on the apples.

While on the phone, we consulted the Fact Sheet on the APAL website on apples and wax, which contained the following statement: "When apples move from cool temperatures to high temperatures under high humidity conditions, they 'sweat' and the wax can 'chalk' or discolour as a consequence." Taking apples from cold storage to ambient temperature could have been part of the problem, but given that planes usually have a low humidity environment, the chalking wax was still a mystery. The caller then related the process for preparing apples for the airline.

Apples are taken from cool storage, washed, paper towel dried, put into a presentation basket and then cling wrapped. We surmised that the cling wrap was creating the high humidity environment and that the drying process has to be more thorough. Hopefully, problem solved and again, Aussie apples have taken to the skies with Emirates. ■

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In addition to the listing of key reports and articles under Subject Index below, each issue of Australian Fruitgrower usually includes:

- **Reports from the Chair of Apple and Pear Australia Ltd (APAL) and the Chair or CEO of Summerfruit Australia Ltd (SAL)**
- **APAL news**
- **Research updates, summaries and abstracts from local and international research projects**
- **A detailed State Roundup from State grower representative bodies, including reports on seasonal and market conditions, industry activities and other state or regional news.**
- **An editorial reflecting matters of topical interest or concern**

The detailed nature of these sections precludes a specific Index however they should not be overlooked when seeking information on industry programs, activities and trends.

Archived issues of Australian Fruitgrower can be viewed and downloaded in PDF format from APAL's and SAL's websites (www.apal.org.au and www.summerfruit.com.au).

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APAL Chair's Report

Chinese apples have arrived!

Almost 11 years after lodging an application to export apples to Australia, the first shipment of fresh Chinese apples has arrived in Australia. The first consignment consisted of only one 40ft container, however, several more containers followed within a week.

The original shipment were labelled 'Great Wall' however later shipments carried different stickers such as 'JCT' and others. The major issue now is ensuring that Australian consumers are aware of the chance of unwittingly buying imported apples.

To coincide with the arrival of the first containers, APAL embarked on a public relations campaign to make consumers aware of the issue and asking them to make "an informed choice" when they bought apples. For this activity APAL utilised the services of Andrea Brydges and her team at Bite Communications. Over the years Andrea has worked on a number of PR campaigns for the apple industry however this was the first time that we had joined together to embark on a consumer awareness campaign. If the amount of exposure is an indicator of a successful campaign then it was indeed successful.

There was a multitude of radio, press and television interviews that included national and regional news as well as current affairs programs such as *Today Tonight* as well as the Mandarin Australian news on SBS TV. Unfortunately some of the TV interviews were held all over the place so there was some hurried running around.

I would like to place on record my thanks to Glenn Fahey from Glenburnie Orchards at Darkes Forest - just south of Sydney, and Scott Montague.

Glenn hosted the *Today Tonight* crew on his orchard as well as making some very strong valid on-camera comments. Likewise, Scott gave up considerable time to work with Channel 10 news in a couple of Sydney fruit shops. As usual Peter Darley from NSW Farmers Association was very active and generated much valuable publicity for our cause. Jason Jarvis in Western Australia and Michael Stafford in South Australia also gave interviews and I am sure that there were others who gave of their time to push the industry message.

*"To everyone involved,
"thank you"*

Preliminary figures compiled for APAL at the end of the first week of media indicated: "The media reach is at just over 9.5 million, with 31 news items, 67 radio news, 47 talkback radio, eight metro newspaper articles, 27 regional newspaper articles, and 14 online news stories".

We have had a number of media issues over the years that have given our industry some great exposure however I am not sure that we have had one that has been as concentrated. It is interesting, but not surprising, that consumers wanted to have some input into the issue, so what was it that generated the interest?

Here are some of the facts that generated comment and discussion:

- Australia has imported fresh pears from China since 1999
- Australia imported 36.2 million litres of apple juice concentrate (this equates to almost 290 million litres of apple juice "drink" when re-constituted) during 2009-10 of which 31.7 million litres came from China and most of the balance from New Zealand and South Africa.
- Australia imports dried apple from China (2008 imports were more than 650 tonnes)
- Australia imports pulp apple from China for the pastry industry.



While most of those who rang talk back radio shows were supportive there were also a number of negative comments that, as an industry, we should heed:

- "apples are too expensive – bring on the cheaper imports"
- "apples are far too often soft and floury – when they are in better condition I might buy some again"

One of the major positives that came out of the campaign was the statement by both Coles and Woolworths that they would not stock imported apples. This was picked up by almost all of the media and was a positive part of the campaign. In all interviews this was reported as a sign of confidence and faith in the Australian apple and pear industry and a reflection of the hard work put in by growers over the years to supply both supermarket chains with a consistent supply of high quality apples.

One of the interesting developments that emerged during the week was the way the imported fruit was priced. I am aware that a few days before fruit arrived, an importer was offering wholesalers 20kg boxes at \$40 per box. When the fruit was delivered the main wholesaler involved then began re-selling at \$80 per box. Later that day they were down to \$60 per box with some of the fruit appearing in Melbourne market on the next trading day with wholesalers there asking \$70 per box.

As a sign of fruit appearance, condition, etc, quite a lot of fruit from the second shipment appeared in Paddys Markets, which is not a market renowned for quality. However fruit that did make it to small independent retailers was retailing for between \$5.99/kg and \$7.99/kg. The fact that the importers were able to land fruit here and on-sell at \$2 per kg in Sydney Markets (and that would have included all of their costs plus a margin) is a sign of the extremely low production costs in China.

So what does this mean for our industry?

It means that for the first time in 91 years Australian consumers now have the choice of imported fresh apples. I am sure that you



Summerfruit Australia launches in Taiwan

► would have also heard by now that at the end of last year the Australian government lost the appeal that it lodged with the World Trade Organisation (WTO) regarding the import of fresh New Zealand apples. Biosecurity Australia (BA) now has to re-do parts of the Import Risk Analysis (IRA) on issues relating to fire blight, European canker and apple leave curling midge. I understand that this work will most likely be completed by mid-2011 and that would allow New Zealand apples to arrive here early in 2012.

We have Chinese apples here now with the likelihood of New Zealand apples in 2012 followed at some stage by the arrival of American apples. It will be a whole new world however we need to continue with an awareness campaign to ensure that Australian consumers make an informed decision when buying apples. It also means that we must continue to fight for effective 'country of origin' labelling and not settle for the half-hearted efforts now being made by some retailers.

The issue on dealing with imports on behalf of our industry will be a major activity of APAL for quite a long time to come.

Floods

In the last few weeks we have all been shocked by the devastation caused by the floods in eastern Australia. Fortunately it appears that the apple and pear industry escaped virtually unscathed however the same cannot be said for our colleagues in other fruit sectors as well as the vegetable industry. They have lost crops, property and infrastructure as well as loved ones. Our thoughts are with them as they head down the long road to recovery.

Re-appointment

I am happy to say that the Board of APAL recently re-appointed John Lawrenson for another term as an independent director. John not only brings a great depth of management skills but also has extensive financial expertise. As a result, he chairs APAL's finance and audit committee as well as being a member of the remuneration committee. John is a great contributor to all activities of the Board and it is great to have him continue for another term. ■

To coincide with the Summerfruit Australia Limited (SAL) stone fruit marketing launch in Taiwan a commercial container of fresh stone fruit arrived via the port of Kaohsiung, for distribution at the Sun Chung and Bin Jiang wholesale markets. This timing was aimed at strongly demonstrating to traders and consumers that Australian stone fruit had returned.

A commercial shipment was cleared by Taiwanese officials on 12 January and immediately distributed to wholesale and retail sectors of the Taipei supply chain. Despite some initial internal confusion between the old and new Taiwanese protocols these minor setbacks were resolved and clearance was expedited.

The fruit (white flesh nectarines) was rigorously inspected by Taiwanese authorities. It was also comforting that the (three) temperature recorders installed to verify the cold disinfestation process whilst in transit performed as required, monitoring the temperature from 2.0°C to a top of 2.2°C for the entire journey. This satisfied the stipulation of 14 days under 3°C for fruit exported from within a Pest Free Area.

As a part of the marketing launch SAL used 20 trays of nectarines for media, charity and sampling activities. The campaign also included catering and the showcasing of speciality recipes utilising the fresh fruit. SAL utilises Horticulture Australia Limited (HAL) to facilitate the domestic and international marketing plan and - on this occasion - Austrade's Taiwan office implemented the necessary ground arrangements for the launch on SAL/HAL's behalf.

In early December 2010, a scoping visit to Taipei had previewed the launch campaign and issued initial invitations for the launch event to major importers and traders. Media coverage of the launch was hugely successful with the three key television networks attending plus local newspaper, magazine and freelance journalists. Most importers were also present and, given the market activity with the Australian nectarines in the supply chain, their presence was particularly pleasing. The campaign strategy included having a high profile television personality as Master of Ceremonies; Ms Pei Zhen - host of a highly rated lifestyle show on Taiwan television - was a popular drawcard. The health theme used throughout the launch was demonstrated by Ms Zhen and broadcast

by the media present. Appropriate opening speeches were delivered by SAL Chair Ian McAlister and Alice Cawte, head of the Australian Commerce and Industry Office, Taiwan.

Ms Zhen conducted a charity auction of a box of nectarines with the funds raised (A\$3,400 equivalent) presented by Ian McAlister to the Principal of Youmu Elementary School - a school for orphaned and underprivileged children who participated with Ms Zhen's showcase of healthy living and world peace message. The SAL launch commenced at 2pm on 13 January and the official ceremony ran for one hour, followed by two hours of sampling, networking and media interviews.

In the aftermath of the event an internet search realised widespread coverage across Taiwan and pending coverage through magazines is reportedly underway with the monthly publication media. In the debrief that followed our launch, commentary was positive and the Australian exposure far exceeded the reasonable predictions in the guesstimate of the launch delegates.

Notwithstanding the 50 guests and media the message of Australian stone fruit returning to Taiwan was very rewarding for SAL's efforts to re-establish in this important market and perhaps fasttrack and return exports to the pre-2006 level of 4,500 tonnes. A visit of the major retail supermarket and wholesale outlets on the following day revealed that display and showcasing of the fruit consignment was widespread.

Competition varied from the equivalent of A\$3.42 per 600grams (Chinese measurement system) to A\$6.04 for five pieces of fruit specially packaged for sale in a top end supermarket. SAL is aware that other container shipments are en route to Taiwan and exporters enjoy success in redeveloping this vital market and alleviate some congestion on the domestic front.

This trade launch was made possible by Promoting Australian Produce, a project grant by Department of Agriculture, Fisheries & Forestry with equal matching of levy payers' funds through the SAL/HAL marketing budget.

John Moore

CEO Summerfruit Australia Ltd
e: ceo@summerfruit.com.au ■

South Australia

Like the rest of the country, South Australia is in the grips of an unusual summer: hot and sunny one day, foggy the next.

Humidity has been unusually high, causing fungal problems in the trees. To quote one grower, "if anyone says he doesn't have black spot, he hasn't looked." To exacerbate the fungal problems an Australia-wide shortage of fungicides is being experienced and this has many growers resorting to whatever they can get their hands on (as long as it's a registered chemical). The main issues are apple black spot (scab) and pear spot. Mildew is less of a problem than drier years.

Continued rainfall events have reduced the requirement for irrigation, which saves considerably on power and pumping costs.

However, that same rain has been disastrous for apple and pear growers who have cherries or other stone fruits, creating financial strain. On the flipside, at least apple sales are solid (pears were long ago sold out) and stocks are rapidly depleting. The low remaining coolstore stock levels should set us up for a good start to the new season.

"The draft (water) plan is too inflexible, not recognising the complexity of the grower's water management systems and high associated investment and costs"

Another unusual effect of the weather has been summer fruit drop occurring over a long period of time and often quite heavily. This has made hand-thinning decisions difficult, particularly without very diligent and observant workers. Regardless, fruit set still appears to be patchy on apples, but good to very good on pears.

On the 10 January the Association lodged a submission response to the Western Mt Lofty Ranges Water Allocation Plan. In the submission, the Association, while supporting regulation of the water resource voiced its concern that the draft plan did not encourage a sustainable sharing of the resource and felt that the apple and pear industry was unfairly burdened and disadvantaged in the management of that resource.

The draft plan is too inflexible, not recognising the complexity of the grower's water management systems and high associated investment and costs, while in no way regulating 'unlicensed users' such as life-stylers and hobby farmers.



Our forecast harvest date is nearly three weeks later than last year. At this time recommended harvest dates for Gala (for long-term storage) will be the 23 February and Packhams (for long-term storage) will be the first week of March. This was due to a green tip date of 28 September, 2010 and significantly lower than average temperatures in November: that funny old weather again!

Greg Cramond
APGA of SA



Queensland

As I write this article more than 70 towns in Queensland have been flood affected and approximately 75 percent of the state is under water. Farms, houses and towns have been decimated and people have been shocked and traumatised by the ferociousness of the flash flooding particularly in the Lockyer Valley. Now the recovery effort is well underway in most areas but the scars from the last few weeks will remain.

The Granite Belt has been relatively lucky compared with many other areas. While there has been some minor flooding in Stanthorpe and some apple trees are showing signs of water logging and dying (less than five percent of orchards on average), no lives have been lost.

Some reports from the Pozieres area indicate that, on average, they usually receive about 750 millimetres of rain per year. In 2010, 1100mm were recorded and 800 of these fell between July and December.

"Continued wet weather may now start to stall growth as there is not enough oxygen in the soil"

Up until 14 January, approximately 246mm have fallen for 2011. Long term forecasts indicate that some areas of Queensland will continue to receive large rain falls until March. This continued wet weather may now start to stall growth as there is not enough oxygen in the soil. This will improve quickly though when growers get some fine, warm weather.

The crop for 2011 is looking good with excellent fruit volumes on the trees at present. Some stone fruit growers have not been so lucky, with apricots and cherries in particular splitting and spreading brown rot. Some growers have lost all of their apricot and cherry crops while others have only incurred minor damage. All of this however pales in comparison with what has happened to some other areas in the last few weeks. Our thoughts and prayers are with the people who have lost loved ones and had their lives ripped apart.

Sadly this will be the last Regional Roundup I write as I move into a new role with Avocados Australia at the end of January. It has been a pleasure working with you all and I have learnt a great deal within my role as Apple Industry Development Officer in Growcom. Unfortunately due to the weather and much of our telecommunications being badly disrupted, I have been unable to contact some of the Queensland growers and other stakeholders to say my goodbyes. I have always been very impressed with the industry's level of knowledge and their preparedness and I know that the staff at APAL and the members of the board are doing everything they can to best represent the interests of the Australian apple industry. Please know that I wish you all the very best for the future and I am sure we will run into each other again.

Julie Moore

Western Australia

"WA will be introducing a voluntary 'Gala' maturity standard...this season as a possible precursor to legislated maturity standards"

► The Executive Manager of the WA state industry body Fruit West, Jonathan Cutting, has left the organisation and has been replaced by Amy Green. Amy hopes to start a new, positive attitude for WA industry and work with growers on achieving real outcomes for greater competitiveness and profitability.

The WA apple industry will be introducing a voluntary 'Gala' maturity standard, of 12% Brix and 6kg pressure this season as a possible precursor to legislated maturity standards.

Fruit West hopes, however, that there will be no need for legislation and that growers and other stages of the supply chain alike will recognise the need for exceptional quality fruit, particularly in view of the new threat from imports, and collaborate to deliver higher quality fruit to their eating consumers.

Independent testing on the 'Gala' variety will be conducted within the market place and points of retail (sale) to gain a better understanding of the quality of fruit currently being sold.

Any consignments not meeting the standard will be advised and offered technical advice to meet the standard in future. The next phase of this project will be consumer research to determine the preferable eating standards of all apple varieties.

On the picking front in the South West, apricots are just starting to wrap up and most orchards are undergoing thinning due to the extreme water shortages experienced this season.

'Fortune' plums are looking sensational in size and quality but won't be ready for picking for another week or so just yet. 'Ebony Sun' and 'Angelino' plums won't be picked until the end of February. 'Bartlett' pears are looking like they will be ready for picking around mid-February and 'Gala' looks like they will start picking between 20 and 25 February.

Excessive rain and extremely high temperatures in the Northern region of WA has caused flood conditions and considerable damage for

areas such as Carnarvon. Growers there have suffered so much damage to their orchards that compensation handouts have been allocated to those affected by the floods. This has not been received well by growers who were affected by the extreme heat but not the flood conditions, as they feel they were just as affected as those who were hit by the rainfall.

All in all, thanks to the extreme weather conditions WA has experienced, picking looks to be well in advance of timings last year. Conditions in the north have exacerbated any shortages that may have been felt by the Queensland floods and so the effects of this will remain to be seen.

The WA industry wishes to extend its heartfelt sympathies to the Queenslanders for the tragic circumstances they are currently facing.

Amy Green
Fruit West

Victoria

"There is still a lot of good fruit on the trees, let's hope it all ends up on boxes"

For 10 years, everyone prayed for rain. Now we wish the atheists had not! Fruit growing is a tough business and it is a credit to the resilience of all orchardist who remain stoic after recent record rains in Victoria that have caused widespread flooding in the north of the state.

While there have been no reports of orchards being flooded, the rain has affected soft fruit crops with cherries and apricots being the hardest hit. In addition, there has been a high incidence of brown rot in stone fruit since the rain.

The apple and pear crops are most unaffected by the rain, however high humidity has increased the potential for fungal diseases and growers must be vigilant and respond quickly. Black spot has been widely reported across the state.

A November storm caused hail damage of up to 80 per cent of crops in parts of the Harcourt Valley. In December, there was also hail from Ardomona in a south easterly line to Shepparton East. There has been some isolated hail damage to parts of Gippsland. So the weather has brought a reasonable amount grief to a good growing season.

January has continued the current cool, cloudy and wet trend of weather in the state. These persistent conditions have caused shortages of fungicides and, in some cases, a breakdown of black spot control for some apple growers. It is the typical suspects - poor coverage, reduced rates and too long an interval between sprays.

Apples and pears continue to look like they may run seven to 10 days late to the start of harvest. The concerns at this point are many; pinpoint black spot coming out in storage; how well the trees have been fed calcium this season and will this have an impact on fruit firmness, bitter pit and lenticel breakdown.

Looking on the bright side, there is very little sunburn and there is generally good colour development for this time in the season.

At the last Gippsland Fruit Growers meeting, IDO Chris Peters spoke about the recent APAL trip to Washington state (US). And on the subject of presentations, Dr Erick Smith from Washington State University at Prosser, gave a

great talk to the Victorian Cherry Growers at Wandin on his recent work in Tasmania on cherry fruit size and firmness relative to bloom date and fruit size relative to limb position and variety.

There is still a lot of good fruit on the trees, let's hope it all ends up on boxes.

John Wilson
Fruit Growers
Victoria



Continued over...►



New South Wales

▶ As we move into the New Year growers in all regions are faced with the newest of challenges – too much rain – rather ironic after the last 10 years of struggling with an ever diminishing supply. The growing regions in NSW have fared very well considering the pressure that some regions have had to cope with.

The cherries have been a bit of a disaster but apples in all regions have set a very good crop and continue to size extremely well. Black spot has reared its ugly head in some blocks in both Orange and Batlow, with a lot of pressure on fungicides during spring. The season would appear to be a good 10 – 14 days later than last year, which may be a good thing with

“Ron Gordon’s retirement from the Batlow Co-Operative due to ill health has been a great loss”

regard to colour. Last year’s fruit stocks are all but cleaned out with prices for red apples reaching an all time high. ‘Granny Smith’ has been slow all year but stocks have also cleared during January. The new season fruit will start on a good note so let’s hope the sweetness and texture don’t let us all down in the rush to catch the good prices.

As all growers would be aware, Chinese ‘Fuji’ are now being sold in Australia so let’s hope consumer loyalty shall make importing unattractive in the future.

Ron Gordon’s retirement from the Batlow Co-Operative due to ill health has been a great loss - to not only Batlow but the apple industry in general. Ron’s accumulated knowledge, enthusiasm and ability to analyse a problem and come up with a solution – whether it be hail netting structures, irrigation, tree structure, off-peak coolstore power savings – the list goes on. Thank you Ron for the sharing of your expertise and all the best in the future. Once again processing fruit is extremely scarce and the industry continues to fluctuate from feast to famine.

That’s all for this month.
David Gartrell

Tasmania

Tasmania has been experiencing some increased rain and some flooding, particularly in the north/north western regions. For some fruit (including cherries and stone fruit) and farming crops, this has produced a worrying time and mixed fortunes. However for apples and pears, as long as we get some settling of the weather and with warmer days and sunshine, the crops will progress quite well.

All growers in Tasmania are aware of the serious weather conditions experienced in other states that have not only affected the horticulture and

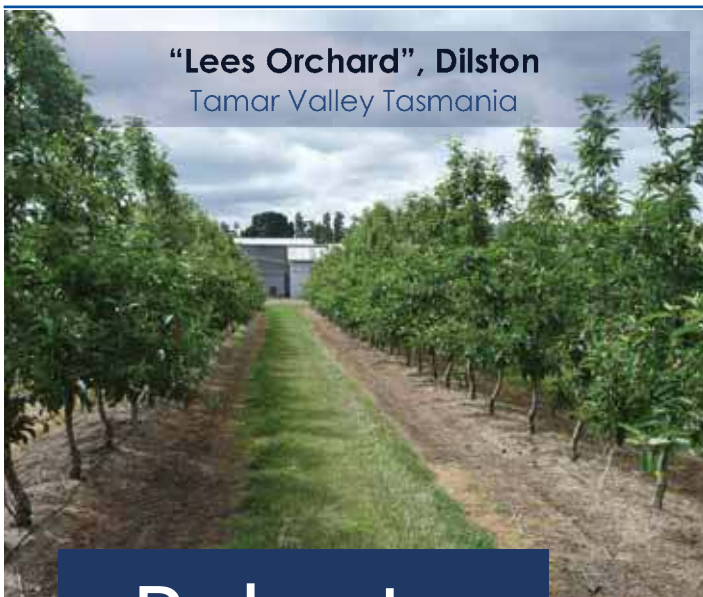
farming industries to varying extents but also the general community with some devastating results in some areas.

Fruit Growers Tasmania continues to progress arrangements for the annual conference to be held in May, and for the national conference to be held in August. Program and registration forms for the May Conference (13-15 May) are expected to be distributed in February. An advertisement for the National Conference (31 July – 5 August) is included in this edition of Australian Fruitgrower. Sponsorship packages

“As long as we get some settling of the weather and with warmer days and sunshine, the crops will progress quite well”

have been distributed and we have already received some positive responses. The conference program and full details will be launched at the May conference.

Sally Tennant
Fruit Growers Tasmania



“Lees Orchard”, Dilston
Tamar Valley Tasmania

11.9 hectares – 2 land Titles **Offers Over \$1,200,000**

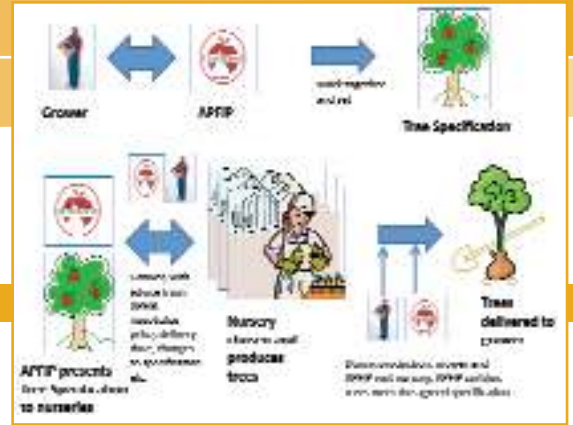
- A rejuvenated apple and pear orchard is offered for sale as a going concern.
- Operated as a family business, over 13,000 trees comprising 17 modern varieties – all irrigated.
- 3,000 cubic metres of fruit storage including controlled atmosphere rooms, retail outlet, packing shed, loading bays to accommodate “B Double” trailers.
- The property also features a spacious 3 bedroom managers home.
- Many newly planted varieties are yet to reach full production.
- Here at Lees Orchards, a family tradition and personal touch has produced profits. Customers love to get to know the farmers who grow their food – it seems to be a world wide trend.



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Figure 1: How the TPS will operate



APFIP offers new nursery tree procurement service

By Mark Hankin, Australian Pome Fruit Improvement Program

APFIP Pty Ltd has developed a nursery tree procurement service (TPS) to improve communication between orchardists and nurseries. The new service is designed to support the introduction of APFIP certified nursery trees into the industry.

The service APFIP is proposing aims to close the information gap between growers and nurseries, allowing growers to better understand the issues nurseries face in the production of nursery trees as well as understanding what is required when placing an order with a nursery. This in turn will allow nurseries to better understand the grower's production situation and their needs when purchasing nursery trees. APFIP will enter a simple agreement with growers

to work with them and the nursery in the production of their nursery trees to achieve the best outcome for both the grower and nursery.

The broad aims of the APFIP TPS are:

- to improve growers awareness of the nursery tree options available to them (certified/non-certified, rootstocks, tree architecture etc) and to help them specify the trees 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 promote the value of certification to growers and nurseries.

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

Growers or nurseries wishing to discuss the Tree Procurement Service and how it may work for them in more detail can contacting me at APFIP on: T: (03) 62 641540, M: 0408 503 528, E: mark@apfip.com.au ■

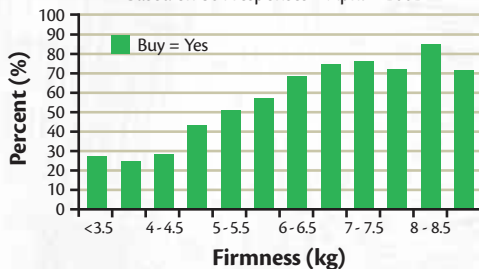
Keep the **crunch** consumers crave!

"Consumers' willingness to buy Galas depends largely on the firmness of the fruit."

– Dr. Eugene Kupferman, Washington State University
(Good Fruit Grower, October, 2010)

Willingness to buy Gala apples

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Adjusting irrigation for canopy size saves water and maintains production

Report by Lexie McClymont and Ian Goodwin, DPI Victoria (Tatura)

Abstract

The aim of modern micro-irrigation systems in orchards and vineyards is to match crop water supply (irrigation volume) with crop water requirement to optimise plant performance and minimise water losses. Data from aerial images of Goulburn Valley and Sunraysia orchard and vineyard blocks were analysed to determine the crop water requirements of individual plants. A large range in crop water requirements was found between and within blocks of pears, apples, peaches, grapevines, citrus and almonds. The analysis enabled water losses and yield penalties associated with different irrigation strategies to be determined. This study highlights the importance of adjusting irrigation volumes to account for differences in tree size and demonstrates a new method for obtaining detailed plant size information.

Orchard and vineyard water use efficiency (WUE) is maximised when crop water supply (irrigation volume) meets crop water requirement so that yield and quality is uncompromised and water losses are minimised.

Modern micro-irrigation systems provide growers with a high degree of control of both the timing and duration of irrigation events. However, spatial variation in crop water requirement can limit a grower's ability to match water supply with water requirement.

Tree and vine canopy cover (CC) is highly variable in orchards and vineyards. Such variability has immediate implications for irrigation with small (i.e. low cover) plants using less water than large plants. Irrigating all trees or vines with the same amount of water will inevitably lead to water losses (i.e. drainage) from over-irrigation of small plants and/or yield penalties associated with under-irrigation (i.e. water stress) of large plants.

Nowadays, CC is relatively simple to estimate with computer analysis of aerial images.

CC of individual trees within a block can be readily determined, providing comprehensive data on both crop water requirement and potential yield. Modelling can then be applied to tree scale data of crop water requirement and potential yield to estimate the water losses and yield penalties associated with failure to match crop water supply to crop water requirement.

The objective of this study was to determine the CC variability and, hence, crop water

requirement variability within blocks in the Goulburn Valley and Sunraysia irrigation districts.

Crop water requirement, water losses and yield penalties were determined for 256 orchard and vineyard blocks based on tree-scale estimates of CC derived from aerial images.

Aerial image analysis

Aerial images (resolution 30 cm/pixel) of the Goulburn Valley (taken in December 2009) and Sunraysia (taken in 2006) irrigation districts were linked to orchard and vineyard information supplied by SPC Ardmora (2010; Goulburn Valley) and SunRISE21 (2007; Sunraysia)

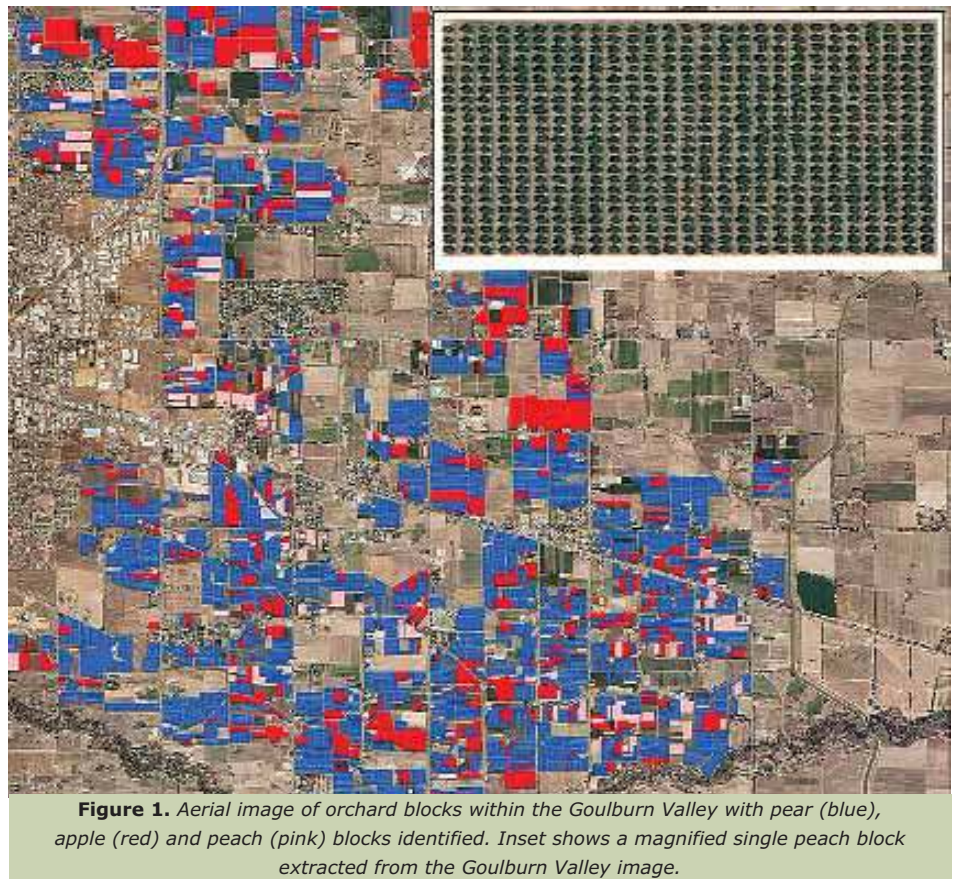


Figure 1. Aerial image of orchard blocks within the Goulburn Valley with pear (blue), apple (red) and peach (pink) blocks identified. Inset shows a magnified single peach block extracted from the Goulburn Valley image.

Table 1

District	Crop	Mean CC	Range	n
Goulburn Valley	Pear	0.43	0.17 – 0.74	70
	Apple	0.43	0.15 – 0.63	33
	Peach	0.41	0.14 – 0.77	31
Sunraysia	Grape	0.55	0.19 – 0.78	72
	Citrus	0.41	0.20 – 0.65	30
	Almond	0.65	0.19 – 0.91	20

Table 1. Average and range of mean block canopy cover (CC) for crops in the Goulburn Valley and Sunraysia irrigation districts; n = number of orchard blocks.

▶ allowing identification of crop type (Figure 1). Blocks representing the major crops within the districts were randomly selected (excluding blocks less than three years old) and data was extracted from the images to determine fractional CC of individual plants within the blocks.

Crop water requirement (ML/ha)

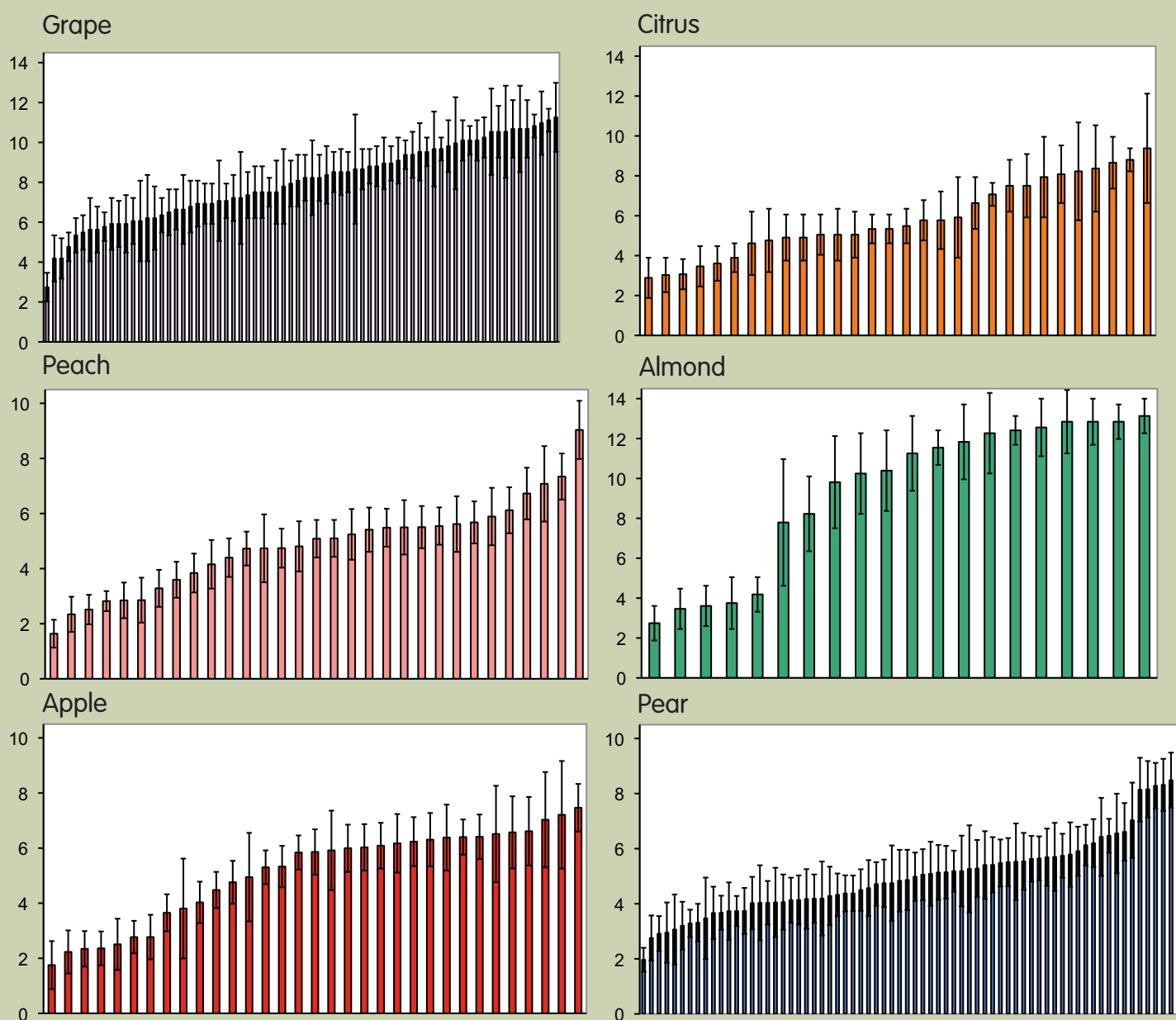


Figure 2. Crop water requirement within A) pear (70 blocks), B) apple (33 blocks) and C) peach (31 blocks) crops in the Goulburn Valley and D) grape (72 blocks), E) citrus (30 blocks) and F) almond (20 blocks) crops in the Sunraysia irrigation district. Error bars indicate standard deviation.

Continued over...▶

Continued...

Adjusting irrigation for canopy size saves water and maintains production

► Calculation of crop water requirement, water losses and yield penalties

Crop water requirement was calculated from the equation:

Crop water requirement = $1.3 \times CC \times ET_0$ where ET_0 was reference crop evapotranspiration for the 2009-10 season and CC was determined from aerial photographs. Cumulative ET_0 during the 2009-10 season was approximately 905mm (November to April) in the Goulburn Valley (www.irrigateway.net) and 1110mm (October to April) in the Sunraysia (www.lmw.vic.gov.au).

A generic crop water production function was used to relate potential yield to crop water supply such that application of less water than required resulted in a yield penalty (expressed as a percent reduction in potential yield) and supply greater than crop water requirement resulted in water loss (expressed as a percent of crop water supply). Water losses and yield penalties were calculated for two irrigation strategies:

1. Crop water supply matches maximum crop water requirement of the block.
2. Crop water supply matches mean crop water requirement of the block.

Two practical assumptions were made, firstly that no alternative water was available (i.e. plants were not able to access groundwater or water from nearby creeks, dams or channels), and, secondly, that water application rates were uniform.

Canopy cover and crop water requirement of major horticultural crops in the Goulburn Valley and Sunraysia irrigation districts.

Across the regions, mean canopy cover of blocks varied 3 to 6-fold, depending on crop type (Table 1). Effectively, this created a range in crop water requirement from 1.6 to 13.1 ML/ha for the sampled blocks (Figure 2). The standard deviation (shown in Figure 2) provides an indication of the degree of variability within blocks. On average for the selected crops, the crop water requirement of the majority of trees within a block fell within ± 0.8 to 1.5 ML/ha of the mean.

Water losses and yield penalties

Mean water losses and yield penalties calculated for the irrigation strategies are presented in Table 2.

Estimates of average water losses for each crop type under the strategy where crop water supply matched maximum crop water requirement were substantial (1.6 to 2.9 ML/ha). In contrast, the strategy where crop water supply matched mean crop water requirement resulted in low average water loss predictions (0.1 to 0.4 ML/ha) but would create average yield penalties of 5 to 7 per cent (Table 2). Maximum yield penalties were 12, 14, 9, 10, 11 and 13 per cent respectively for pear, apple, peach, grape, citrus and almond crops.

Table 2. Mean water losses (WL, % of water applied) and yield penalties (YP, % of potential yield), caused by canopy cover variation, under two irrigation strategies where crop water supply matched maximum crop water requirement (CWS=CWRmax) and where crop water supply matched mean crop water requirement (CWS=CWRmean) for pear (n=70), apple (n=33), peach (n=31), grape (n=72) citrus (n=30), and almond (n=20) crops in the Goulburn Valley and Sunraysia irrigation districts. Note that yield penalties do not occur when crop water supply meets maximum crop water requirement (CWS=CWRmax).

Table 2

Crop	CWS=CWRmax WL (%)	CWS=CWRmean WL (%)	YP (%)
Pear	24 (± 7)	3 (± 1)	6 (± 2)
Apple	23 (± 7)	3 (± 1)	7 (± 2)
Peach	20 (± 5)	3 (± 1)	6 (± 1)
Grape	25 (± 8)	3 (± 1)	5 (± 2)
Citrus	21 (± 6)	3 (± 1)	7 (± 2)
Almond	20 (± 9)	4 (± 2)	6 (± 3)

Conclusion

This analysis has provided an indication of the range in canopy cover and subsequent crop water requirement both between and within blocks, of the major perennial horticulture crops (pears, apples, peaches, grapes, citrus and almonds) in the Goulburn Valley and Sunraysia irrigation districts. The range in water requirement between blocks for each

crop type was 3- to 6-fold. This highlights the need to adjust irrigation inputs according to the canopy cover characteristics of individual blocks. Applying a regional mean crop water requirement will result in under- and over-irrigation of blocks.

Within-block crop water requirement of pear, apple, peach, almond and citrus orchards and vineyards was found to be highly variable. Theoretical analysis of aerial images suggests substantial impacts on drainage and yield depending on irrigation strategy. Predicted water losses where irrigation is applied to meet maximum crop water requirement of the block were substantial (typically 20 to 25 per cent of water applied), whereas irrigating to the mean crop water requirement of the block reduced predicted water losses to just 3 or 4 per cent but would cost the grower 5 to 7 per cent of potential yield. While irrigating a block to the mean crop water requirement is desirable in terms of limiting water losses, the yield penalties associated with this practice could mean that it is more economically beneficial to irrigate to meet maximum crop water requirement.

Field experiments are currently being conducted to demonstrate irrigation scheduling based on canopy cover. Site specific irrigation management, whereby blocks are divided to reduce variability in crop water requirement, is being studied. The impacts of these approaches on water use, yield, fruit quality and plant water status will be reported in future articles.

Acknowledgements

We acknowledge the financial support of the Department of Primary Industries Victoria and the CRC for Irrigation Futures.

Further reading

Allen, R., Pereira, L.S., Raes, D. and Smith, M. 1998. Crop evapotranspiration. Guidelines for computing crop water requirements. FAO Irrigation and Drainage Paper 56. FAO, Rome, Italy. Goodwin, I., Whitfield, D.M. and Connor, D.J. 2006. Effects of tree size on water use of peach (*Prunus persica* L. Batsch). *Irrigation Science* 24:59-68. Williams, L.E. and Ayars, J.E. 2005. Grapevine water use and crop coefficient are linear functions of the shaded area measured beneath the canopy. *Agricultural and Forest Meteorology* 132:201-211. ■

PHA BOLTs into online training sphere

Minimising the biosecurity risks posed by insects, diseases and weeds that are found overseas or are new to Australia is a key focus for plant industries. To assist stakeholders in maintaining Australia's world-class biosecurity system that protects our agricultural and horticultural sectors, Plant Health Australia (PHA) has launched its Biosecurity Online Training system (BOLTs).

BOLT explains Australia's biosecurity system in detail and demonstrates how it helps to ensure the viability of the apple and pear industry. In addition, it explains the response processes in place to tackle new pests that are detected in Australia, while outlining the roles and responsibilities of industry and government personnel in this process.

"Knowing how your industry is involved in responding to a new pest means better protection for your livelihood," said Dr Stephen Dibley, PHA Program Manager (Training and Biosecurity Preparedness).

"BOLT helps growers and other stakeholders to gain a better sense of understanding of where their activities fit in the national biosecurity perspective."

Another advantage of BOLT is that it demonstrates how industries are integrally involved in responses to new pests. Under the agreed arrangements of the Emergency Plant Pest Response Deed (EPPRD), all affected parties, both government and industry, have an equal say in the response. The EPPRD is a legally binding agreement between industry and governments covering the management and funding of responses to Emergency Plant Pest (EPP) incidents, including the potential for reimbursements to owners directly affected.

The apple and pear industry is a signatory to the EPPRD, and therefore plays a crucial role in responding to any new pest that could impact on the pome fruit industry. To be effective in

protecting the industry, all stakeholders, from growers to executives, need to know where they fit in to the biosecurity continuum. They also require open and free access to information and sound knowledge of their roles and responsibilities. All this information can be found through BOLT, thus creating an even playing-ground for all those guiding biosecurity operations.

According to Dr Dibley, "There are a large number of exotic fruit pests that aren't present in Australia and to ensure they do not become established here, industries and governments need to work together. For this partnership to be effective, knowledge of the system is required by all stakeholders across the biosecurity continuum. Access to this knowledge is really what BOLT is all about."

Access to PHA's *BOLT* is free, open to all stakeholders, and is found at the PHA website: www.phau.com.au/training. ■



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Growing your market: Getting the harvest right

By John Wilton, Deciduous Fruit Specialist, AgFirst

Relative to many advanced western economies, fresh apple consumption in Australia is considered low. There is obviously considerable scope to grow the market. The key to growing the market lies in presenting the consumer with a great eating experience that will persuade them to buy again.

Consumers want crisp, juicy, flavoursome apples and the guarantee that every time they select an apple, the eating experience will be similar. Pears need to be melting, sweet and juicy.

Craig Hornblow, in the paper he prepared for the Future Orchards 2012, January 2009 meetings included this quote:

“An Australian study found that after purchasing a bad apple, consumers respond by; changing cultivar (58 per cent), purchasing fewer apples (31 per cent), stopped buying apples (17 per cent), switched to other fruit (24 per cent)”.

This demonstrates how easy it is to shrink, rather than grow your market. Consistent product that meets or exceeds the consumer's expectation will grow the market and in this regard, it is the crisp, crunchy, juicy fruit that brings them back, not the tired, dry, mealy, over-mature fruit.

Every piece of fruit you sell needs to match or better consumer expectation. By this stage in the growing season, early varieties are being harvested, or about to be, mid-season and later varieties well on towards harvest, so there is not a lot more to be done with the crop, except harvest it.

By now the objective should have been to grow the crop to the stage where the fruit on the tree meets market requirement and specification in regard to size range, colour, fruit finish and pest and disease status.

This should definitively be the case with early- and mid-season varieties. With later varieties, there is still some opportunity to groom the crop to 'improve' its outturn with

touch-up thinning, adoption of practices to improve colour such as reflective mulches, summer pruning or leaf plucking.

Harvest maturity

Once you have done everything to get the crop right before harvest, stage of maturity at harvest and post harvest management of the crop are the main determinates of eating quality.

For longer term storage, the fruit needs to be harvested relatively early in its harvest period, because a certain amount of ripening will proceed over the storage period. As ripening proceeds the fruit becomes sweeter, softer and eventually dry and mealy, a stage at which no one wants to eat it. This is a common problem with fruit that is picked too late in the maturation cycle. Harvesting over-mature fruit is undoubtedly responsible for the large majority of poor quality fruit offered to the consumer.

Steven Tancred from Orchard Services in Queensland wrote an excellent paper on harvest maturity for the Future Orchards 2012 program in January 2009. This paper gives details on how to assess fruit maturity, as well as providing hard data on historical fruit maturity stage at harvest, for a number of fruit lines harvested by Australian growers. The data he reports shows that well under half of the lines studied were suitable for long term CA storage due to over-maturity at harvest.

He also reports some in depth maturity data on Pink Lady™ for the 2008 harvest season, which showed that less than 10 per cent of the lines analysed had starch readings in the optimum range for recommended for Smartfresh™ treatment. The other 90 per cent-plus, already had higher than recommended starch readings. This is an iconic Australian variety which is about to come up against some stiff competition in the eating quality stakes from domestically produced Jazz™, which is an apple with exceptionally high eating quality in regard to flavour, flesh texture and juiciness. If Pink Lady

is to continue to dominate the premium end of the Australian apple market, a much better job on harvesting it at optimum maturity will need to be done.

With virtually all varieties except 'Granny Smith', the grower faces the harvest dilemma. Do I wait for increased fruit colour and size or do I pick at optimum maturity? In the ideal world you can achieve all these, but life is never perfect.

Typically growers are sacrificing eating quality to achieve a minimum colour specification. Therefore, you must do everything that is commercially sensible to increase foreground colour. A number of management inputs are possible and have been well documented in previous Future Orchard papers. Go to the library and refresh your memory.

Measuring fruit maturity

Maturity testing should commence around 14 days before anticipated harvest date, then repeated at regular time intervals - usually weekly - or more often if maturity appears to be progressing rapidly.

Maturity development is determined by the objective measurement of starch degradation as measured by starch iodine patterns, fruit firmness by pressure testing and sugar levels (soluble solids) by Brix testing of juice with a refractometer and background colour against green/yellow swatches. Sometimes titratable acidity levels are measured and very sophisticated maturity testing may also measure internal ethylene content of the flesh.

Titratable acidity reduces as maturity advances and can be a key determinant of flavour in some varieties, particularly those that tend to be bland and sweet if over mature, such as the 'Royal Gala' group.

For practical purposes, particularly for tracking maturity in the orchard, the starch iodine test and fruit pressure measurement are the most convenient and present a good indication of fruit maturation stage.

Brix measurement is a good companion test to starch measurement and can provide early warning of conversion of starches to sugars in fruit with high starch content that may be well advanced in their maturity, before a starch



Figure 1: Starch testing is the best tool for judging fruit maturity in the orchard.



Figure 3: Careful selective picking for size, colour and maturity leads to high packouts. This line of orchard run 'Royal Gala' exported in the bin, packs in excess of 90 per cent Grade 1 fruit.

► degradation pattern appears. If Brix readings are high and there is little starch movement this suggest that it is time to pick, even though the starch pattern may be telling you it is not quite there yet.

Conversely delaying harvest when starch and pressure testing shows the fruit should be picked because Brix levels are low, is likely to lead to over maturity and poor out turn.

The low Brix is just telling you that the fruit is not going to have acceptable sugar levels because, if starch degradation is already

advanced, there is not a lot left to convert to sugar, so irrespective when you harvest the fruit, there will not be much lift in sugar. The smart thing to do is harvest such fruit at optimum starch and pressure, so it will still be crisp and juicy in the hands of the consumer and still an acceptable eating experience, because these characteristics usually override other fruit qualities.

Tackling the uniformity problem

Presenting the consumer with a uniform product is a very critical factor in growing the market. As Craig Hornblow said in his presentation to

Future Orchards 2012, *Harvest Management Considerations* (January 2009); "We need to focus on the Mars Bar™ as our competition: we are in the snack food business. Consistency will be the key success in increasing consumption of apples and the ability to improve pricing points."

Unlike the Mars Bar, apples are a natural product and do not come out of a machine that makes each one to the same specification, some variability in the product is bound to occur, the challenge is to minimise this variation.

Continued over...►



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Continued...

Growing your market: Getting the harvest right

► Harvest is your last chance to smooth out variation in the crop, because it largely relates to the tree and orchard factors, so once it is harvested and in the coolstore it is no longer possible to segregate on the basis of tree and orchard factors.

Sources of Variation:

- block-to-block and even within block eg. soil type, rootstocks, variety strain.
- orchard management – variation in tree vigour, crop load, irrigation, pruning etc.
- harvest strategies eg. strip verses select picking, interval between picks.

The level of variation across the orchard needs to be recognised, maturity monitoring based on it and harvest strategies designed to minimise the variation within the crop.

AgFirst continues to be astounded at the number of growers that measure the success of a crop by the least number of picks required. One of the most significant ways you can reduce variability of a line is to multipick it. Their aim to ensure each individual fruit is picked to optimum colour and maturity.

Seasonal variation – the ultimate curve ball

The only thing that is certain about growing fruit is that every season is going to be different. Your growing season, particularly in Australia, has a profound effect on the crop you grow.

The 2010-11 growing season has been one of extremes, near record rainfall for spring and early summer in the eastern States, while the West has had it pretty dry.

I do not know what the weather nearer and over the harvest period will bring, but you have already had abnormal growing conditions that will impact on your crop.

In the districts with the above average to extreme spring/summer rainfall events, trees will have been a lot more growthy, leading to more shade and colour problems. Fruit size will be larger, softer and probably lower in soluble solids than normal.

Our experience indicates that in seasons that have a lot of dull cloudy weather, the fruit is not well acclimatised to bright sunny or hot

weather, so sun tinting damage to the fruit becomes a bigger problem when the sun finally appears.

Fungal diseases, particularly summer rots such as anthracnose, can be a major problem, unless robust protectant fungicide programs were applied over the wet weather periods.

Dr Colin Little, in the paper he wrote for September 2007 Future Orchards 2012 program, presented data on the effect of different seasonal weather patterns on fruit behaviour. Looking at his findings, this season is likely to give earlier ripening, low sugar and poor colour. High tree vigour may also increase bitter pit type problems.

I would also be keeping a wary eye out for fungal rots, including progressive core rots in susceptible varieties such as 'Red Delicious' and 'Fuji'. Fruits affected by core rots usually ripen prematurely with advanced colour and can be culled out of the crop prior to harvest.

Summer rots tend to lie dormant after infection and then as the fruit ripens, begin growing into significant lesions. 'At risk' blocks usually have a few rots showing by harvest. 'Royal Gala' is

particularly prone to these rots. The ones you see before harvest are usually the tip of the iceberg and many more can be expected to appear after harvest. If you have suspect lines hold a few samples at ambient temperatures for a couple of weeks to see how many more rots appear. ■

Figure 2: Reflective mulch is the most effective tool for advancing fruit colour development, so that the crop can be picked at optimum maturity, rather than when over-mature.





Saving apple storage costs

By Dr Gordon Brown, Technical Editor – Apple and Pear

A major cost in marketing apples is the cost of electricity for the operation of cold and controlled atmosphere rooms. With the sharp rise in electricity costs experienced in many regions in recent years this is becoming a major concern. This article summarises some ways of reducing the costs of running coldrooms.

SmartFresh and higher storage temperatures

With the introduction of the SmartFresh® system there is a possibility of using this technology to assist in successful storage of fruit at a higher than normal temperature which could save refrigeration costs.

To investigate this, in 2007 and again in 2008, I set up a small self-funded experiment where Pink Lady™ fruit were either left untreated or underwent the SmartFresh process. These two groups of apples were then placed in large insulated chambers that were vented, and these were placed into a commercial controlled atmosphere room in which they were stored. Small fans were placed in half of these boxes to provide additional heat.

In 2007 a temperature of 4.5°C was maintained in these heated chambers

compared to 0.5°C for the control fruit. In 2008 the heated boxes maintained 2.5°C compared to 0.0°C for the control boxes. Gas sampling tubes were installed into the chambers in 2007 and no difference in atmosphere was detected between the chambers. After six months of controlled atmosphere storage the fruit were removed and ripened at 20°C in 2007 for seven days (no ripening in 2008) prior to fruit quality assessments.

No difference in fruit greasiness was observed in either year and in 2007 the SmartFresh treatment at 4.5°C had higher levels of fruit sugars. The storage temperature was found to have minimal impact on fruit firmness in both years (Figure 1) although SmartFresh was observed to increase firmness in both seasons with the SmartFresh fruit held at the higher temperature having superior firmness to untreated fruit stored at either temperature.

The softer fruit in the 0°C chamber in 2007 may be a result of these fruit expressing severe levels of internal browning (Figure 2) in this season and at this storage temperature. No internal browning was encountered in the fruit used in 2008.

On the basis of these results, in 2008, a grower in Tasmania stored their Pink Lady apples at a higher temperature and successfully marketed these fruit for eight months - two months longer than most other growers in the region who stopped marketing due to internal browning problems. In 2009 two growers were using this storage approach.

In order to determine the energy costs savings associated with storing apples with SmartFresh and at higher temperatures, several commercial scale trials have been conducted and two of these were presented at the International Horticulture Congress in Lisbon last year.

One of these trials was based in Germany, using 'Gala' apples over 2008-09 and 2009-10 and the second in trial was in Spain in 2009-10, also using 'Gala' apples. In both cases two identical controlled atmosphere rooms (210 tonne rooms in Germany and 1200m3 rooms in Spain)

Figure 1:

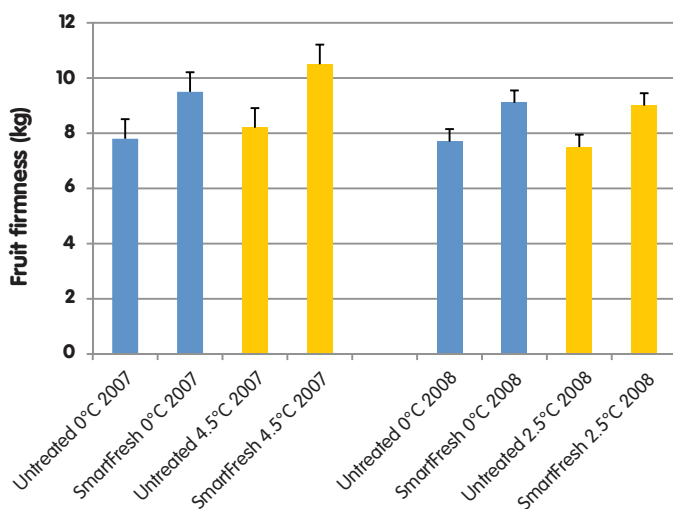


Figure 1. The impact of SmartFresh® and storage temperature on fruit firmness of Pink Lady fruit after six months of controlled atmosphere storage for two seasons. Bars represent 5% LSD value within each year.

Figure 2:

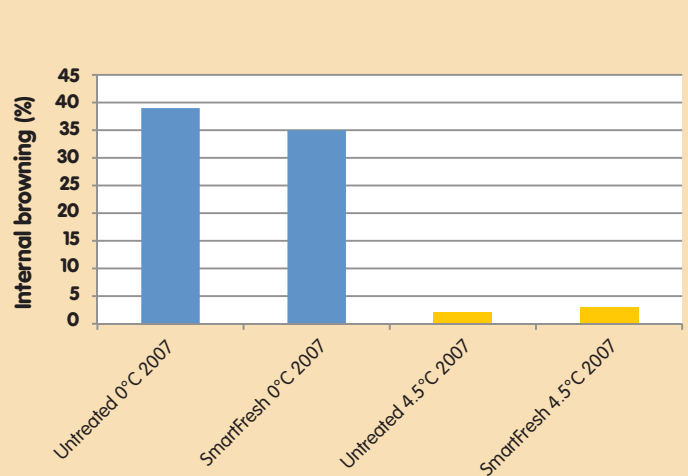


Figure 2. Levels in internal browning in fruit stored at different temperatures while under controlled atmosphere storage conditions for six months.

Continued over...▶



Continued...

Saving apple storage costs

► were simultaneously filled with 'Gala' apples sourced from the same growers in each region.

One room was then run as a conventional controlled atmosphere room and held at 1.5°C (Germany) or 0.5°C (Spain) while the other room had SmartFresh and held at 4°C (Germany) or 1.5°C (Spain). After six months of storage (Germany) or four months (Spain) the fruit were removed and assessed for quality and the energy used in the storage of the fruit calculated.

It was found that the cost of energy for storing the fruit using SmartFresh and a higher storage temperature was 35 per cent less in Germany and 27 per cent less in Spain (Figure 3). These calculations are based on EUR 0.112/kilo Watt in Germany and EUR 0.075/kW in Spain (14.8c/kW and 10c/kW respectively).

No adverse effect on fruit quality was observed with the SmartFresh/high storage temperature fruit remaining firmer than the conventional controlled atmosphere approach. For eating quality no difference in sensory evaluation of the fruit was recorded in Spain while in Germany it was found that the consumers preferred the fruit stored with SmartFresh and at a higher temperature.

Confirmatory trials were conducted in the United Kingdom and can be viewed at http://www.smartfresh.com/assets/attachments/advertorials/2010/2010_Jun_AppleAdvertorial

_Grower.pdf.

It should be noted that while these studies have shown that it is possible to reduce storage costs if SmartFresh is used, the savings in energy are less than the cost of SmartFresh. Hence this treatment is only applicable when SmartFresh is being used for other reasons, although the procedure does allow for some clawback of the cost of SmartFresh and demonstrates further advantages of using the SmartFresh System in terms of energy conservation and reduced carbon footprint.

Coldroom operation and energy source

A close study of Figure 3 shows that while the cost of the refrigeration compressor is the major energy cost in the coldrooms, the ventilation fans are also a major cost. The fact that this cost also drops in the two examples above - with the increased coldroom temperature - indicates that in the above examples the fans were only active when the room was being cooled.

Most forced draft apple storage rooms operate with approximately 30 air changes per hour when under continuous operation. These high air flow rates provide fast and uniform cool down rates throughout a room. However, once the field heat is removed from the fruit, much lower air rates are sufficient to maintain uniform temperatures throughout a room.

These fans can add 250 Watts of energy/bin/day and given that the heat of respiration of apples

held at 0°C is only 100 Watts/bin/day the refrigeration system is removing two and a half times more heat generated by the fan motors than it is from the fruit itself if these fans are left running continuously (<http://postharvest.tfrec.wsu.edu/pgDisplay.php?article=N114B>).

In 1983, Gilbert E. Yost, an agricultural engineer with the USDA-ARS, Tree Fruit Research Laboratory, Wenatchee, reported on different evaporator coil fan cycling schemes, such as 12 hours on/12 hours off; 6 hours on/6 hours off; 8 hours on/16 hours off; and 16 hours on/8 hours off. This work was conducted over a five-year period in newly-constructed rooms and also in older rooms.

Yost concluded that fan and refrigeration cycling works and proper fruit temperatures are maintained, and a significant amount of energy can be saved, as illustrated in Figure 4. During the five months of this study the 12 hour cycling of refrigeration and fans reduced energy use by just over 20 per cent.

A summary of the findings from this study includes:

1. The air flow pattern in a loaded room does not change throughout storage.
2. In the rooms tested, the average fruit temperatures were maintained between -0.5° and 0°C. with the fans run continuously, one-third of the time, one-half of the time, or two-thirds of the time.
3. There was a maximum fruit temperature gradient from the coldest to the warmest fruit of about 2°C. Fruit temperature differences are affected by room layout, total fan capacity, stacking pattern, stacking accuracy, and others. This needs to be monitored if cycling fans.
4. In "typical" rooms with coils located above the bins blowing air out over the bins, with air returning between the stacks as well as filtering back through the bins, the apples in the top bins were the coldest.
5. In well-insulated rooms, the average fruit temperature rose 0.5°C. when the fans were shut off for a 36 hour period. Theoretically, using a heat of respiration of 100 Watts/bin/day, and the specific heat of apples (the energy required to heat a bin of apples 1°C = 100 Watts / bin) the fruit temperature would rise 1°C per day. ►

Figure 3:

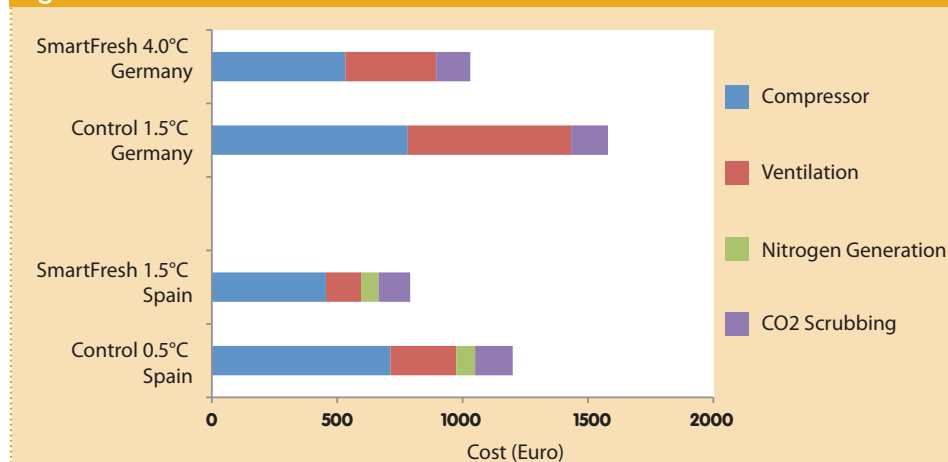


Figure 3. The energy cost of storing apples conventionally or with SmartFresh and at a higher temperature in Germany and Spain (based on 14.8c/kW and 10c/kW for each country respectively).

Figure 4:

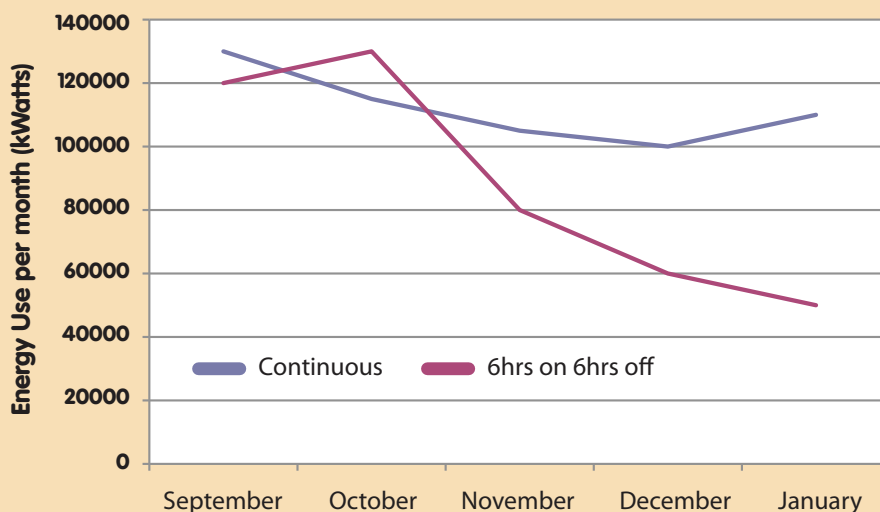


Figure 4. Effect of cycling refrigeration compressor and ventilation fans on energy used within a six room coldstore complex. source - <http://postharvest.tfrec.wsu.edu/pgDisplay.php?article=N1I4B>.

- ▶ 6. Fruit quality evaluation indicated that there was no difference between the fruit held in rooms with continuous fan operation and that in rooms with cycled fan operation. (for more information visit <http://postharvest.tfrec.wsu.edu/pgDisplay.php?article=N1I4B>)

As most cold store operators would have experienced, if there is a refrigeration failure then, provided there is no heat input into the room, the fruit will remain within 1°C of the desired temperature for a day or more. It should be noted that a single 100W light bulb, if turned on will generate the equivalent heat in a day as 24 bins of apples. Hence it is important to ensure that sources of heat are turned off when the refrigeration plant is not operating.

Hence this study has shown that it is technically feasible to cycle both the compressor and fans for only eight hours per day. For further cost savings this could be during periods of off peak electricity availability with the system turned off at other times. If multiple compressors are in use then consider connecting them to different power supplies to allow for top up cooling or cooling to opened coldrooms during the day.

Why not demonstrate this potential cost saving to yourself by checking the times that off peak tariffs apply in your region then a couple of days in a row physically turn off a room during periods of high power cost and see what happens. Remember to turn the room on at the end of this experiment though!

It will also be necessary to consider how the field heat from recently harvested fruit is going to be removed especially if SmartFesh has not been used. Again this is where SmartFresh

use can have an energy saving as research in Britain has shown that with SmartFresh it is possible to use off peak electricity to remove field heat from the fruit with no impact on fruit quality (SmartFresh presentation to growers, Melbourne, June 2010).

In summary

- 1) If SmartFresh has been used then consider storing fruit at a temperature higher than normal, say 2 - 4°C. This could potentially reduce storage power bills by 30 per cent.
- 2) Ensure that internal sources of heat such as lights and fans are turned off or used to a minimum.
- 3) Consider cycling refrigeration plant and fans, this could reduce power bills by 20 per cent.
- 4) If cycling consider the use of off peak electricity. Depending on location this could reduce power bills by 50 per cent.

References and further reading

Costa-Pereze, Dupille, Plaza and Pages. 2010. Effect of 1-Mcp on Gala Apple Cultivar: Comparison between Two Different Cold Storage Temperatures.

<http://www.ihc2010.org/eposters/poster.asp?posterId=1064&searchTerm=&category=126>

McCormick, Neuwald and Streif, 2010. Commercial CA- storage case studies show potential energy savings with 1-MCP and 'Gala' apples. Poster SO2 409, International Horticulture Congress.

SmartFresh. http://www.smartfresh.com/assets/attachments/advertorials/2010/2010_Jun_AppleAdvertorial_Grower.pdf.
Waelti, 1983. Energy conservation in apple storages.

<http://postharvest.tfrec.wsu.edu/pgDisplay.php?article=N1I4B> ■

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European trends in apple planting systems

Report by John Wilkie, Agri-Science Queensland

I recently visited apple and pear growing regions in Italy, Spain, France, Belgium and the Netherlands as part of a study tour, which also included attending the International Horticultural Congress in Lisbon, Portugal. The tour was funded by the levies of apple and pear growers and Horticulture Australia Limited.

The main purpose of the study tour was to have a look at commercial and experimental apple planting systems and culture across these European growing regions, and look at the potential applications for Australian environments.

There were a few important similarities in the apple culture between these growing regions. The all encompassing similarity is the use of high density planting systems.

Prof. Luca Corelli-Grappadelli from the University of Bologna described the evolution of planting systems as a continuum from old style inefficient low density orchards to modern high density highly productive orchards. I suppose one of the major reasons these growers are further along this continuum than the Australian industry, in general, is that their land costs can be extraordinarily high.



Figure 2. An example of the 'Bi-baum' apple training system at the Laimburg Experimental Station, South Tirol, Italy.

For example, in the South Tirol province in northern Italy, I was quoted values for horticultural land at anywhere from 600,000 to one million Euros per hectare (approx. AUD \$900,000 to \$1.5 million), and consequently there is barely a single square metre of land down in that valley that is not being utilised for either high value horticulture or urban land use.

A second similarity between these growing regions is the planting of highly feathered two-year-old trees. This advanced planting material is essential for the high early yields these growers require. I suppose their focus on high early yields is another consequence of their high land prices. A third similarity is the choice of rootstock, with M9 being the rootstock of choice in all growing regions. This is because M9 tends to give trees in these areas the right balance of precocity, vigour and fruitfulness. I think rootstock performance in Australian environments is a question that requires more attention.

I think we would benefit significantly from a greater understanding of how a range of rootstocks perform under the very varied growing environments throughout Australia.

Of course there were also differences in the planting systems used by growers in the different regions. I think the biggest conceptual difference I encountered was that of systems that use permanent branches compared with systems that renew branches. The majority of the apple training systems that I encountered, across most of the growing regions, used renewal pruning on at least a portion of their canopy.

For example the predominant training systems promoted in The Netherlands, by consultants such as Jan Peeters from Fruit Consult, is a central leader with a base level tier of three to four branches that are supported by one trellis wire on either side of the row about 1.2m above the ground and about 0.4m from either side of the trunk. The supports for these basal tier branches allows further extension of these branches into the row than would be possible under the weight of fruit which they carry.

These branches only remain while they are considered to have a good balance between vegetative and reproductive growth, and are removed for renewal once their diameter increases above one third to one half of the diameter of the central leader. The remaining lateral branches along the central leader are non vigorous branches that are renewed frequently.

Replacement shoots in their first year of growth are retained only if they have a terminal flower bud that will produce fruit in the following season. Following their second season of growth, the one-year-old wood at the apex of these later shoots will often be tip-pruned.

One system that relies on permanent branches is the centrifugal training system which was developed in southern France by Dr Pierre-Eric Lauri. Well spaced limbs along the central leader of the tree are retained and bent down to below the horizontal to manage the balance between flower production and vegetative growth. Structural dormant pruning of these trees aims to leave the permanent branches complex.

Shoots are removed from the permanent branches for one of three reasons. First, shoots are removed if they originate from the bottom of the branches and are growing toward the ground, because the fruit produced on these shoots is likely to be shaded. Second, all shoots and spurs close to the trunk are removed, because fruit originating from these shoots is also likely to be shaded. Third, spurs and short-to-medium length one-year-old shoots that appear to contain flower buds are counted and any of these spurs and one-year-old shoots that are excess to the target crop load, based on the fruit per cm² of branch cross-sectional area, are removed. The result is a tree structure characterised by long, pendant, complex limbs, and more regular



Figure 1. A version of the 'fruit wall' grown at the IASMA research centre in northern Italy.



► bearing even in inherently biennial cultivars such as 'Fuji'. The two systems described above are conceptually very far apart, but they achieve exceptional results in their respective environments, which are also very different.

I think the main lesson for us here is that whatever system we use, we need to make sure that its components (rootstock, planting density, etc) combine to deliver a system suitable to the environment.

The Tree Structure component of the current PIPS (Productivity, Irrigation, Pests and Soils) research program is developing a management strategy for Australian growing environments which has similarities to the French centrifugal training system described above. One benefit I see of the approach being trialled by the PIPS research team is that it will potentially provide a method for precision management to be applied to existing central leader systems that are planted at a range of densities and on a range of rootstocks.

New ideas

One of the things in the back of the minds of several of the scientists I visited is potential planting systems for a future of mechanisation and robotics. So how can we manipulate apple tree canopies to present the fruit for automated thinning, harvesting, and other operations? There were two planting systems in particular which appeared to have characteristics suitable for mechanisation.

The first is the so called 'fruit wall', which I saw trialled at the San Michele all'Adige Institute for Agriculture (IASMA), but which I believe has been developed in France by CtiFl. The version of the fruit wall that I saw was a high density central leader setup for which minimal dormant pruning is undertaken. During the growing season, when the new shoots are still actively growing, the trees are mechanically pruned with a vertical cutter bar. The result is a very even canopy surface with well exposed fruit (Figure 1).

The second system is the 'bi-baum' (double leader), which I also saw in northern Italy at both the IASMA and Laimburg research centres (Figure 2). These double leader trees are planted at densities similar to a high density

spindle tree, with maybe 10 per cent less trees within the row. The idea behind these double leader trees is that the vigour is split between the two leaders, so that vegetative growth is easier to manage. Lateral shoots on the double leader trees tend to be less vigorous than on single leader trees, which will probably lead to a narrower canopy than a single leader tree and greater exposure of the fruit to canopy surface. I think it will be exciting to watch the evolution of these double leader systems over the next few years.

Where to for the Australian industry

I think any of these new planting systems are worth evaluating for adaptation to the Australian industry, but if we're going to get the most out of our limited research funds we probably need to think a little more strategically than empirically testing a range of new apple planting systems on a research station somewhere.

This is because the Australian industry is spread across such diverse environments, and we can't underestimate these influences.

We need to be undertaking our research trials in a range of our Australian growing environments to better understand the factors affecting the growth and fruiting of our apple trees in these areas. This understanding will help us to modify planting systems appropriately.

The PIPS research program is currently undertaking research in multiple environments, and I think we need to continue to this trend.

The obvious place to start would be to look at the performance of our conventional and emerging rootstocks in

a number of Australian growing regions (this has never been done in Australia), from both a productivity and underlying physiological perspective.

Acknowledgements

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International apple and pear research update

Compiled by Dr Gordon Brown, Technical Editor – Apple and Pear

BREEDING AND NURSERY

Italy

The genetic difference between a normal yellow skinned Williams pear (Bartlett) and a red skinned mutant, Max Red Bartlett has been investigated to determine the enzymes responsible for the red skin colouration in this cultivar.

Belgium

The S alleles, responsible for pollen compatibility, of commercial apple cultivars (*Malus domestica*) were compared to that of European wild apples (*Malus sylvestris*) and it was found that while the *M domestica* S alleles are present in the wild apple there are a greater number of S alleles in the wild population which could be introduced into breeding programs for improved pollination.

USA

Prior to the American Revolution, seedling apple trees that produced sweet apples were selected as superior fruit and, by 1800, pioneer nurserymen were grafting and selling these trees. By 1820 craft nurserymen marketed tens of thousands of grafted apple trees annually and were among the most commercially oriented farmers in the north west of the USA.

Iran

The storability of 5 early ripening and 5 mid-season ripening cultivars of apple in a heritage collection of apples was studied to identify potential new cultivars for fresh production and it was found that 2 of the mid-season cultivars could be stored (in air) for up to 4 months while the worst cultivar only stored for 45 days in air.

Canada

Three rootstocks, AR86-1-20, CG.008, and CG.30 were compared with M26 at three locations. It was concluded that CG.008 could be a good choice for a productive, well-anchored semi-dwarf rootstock producing trees between M26 and M7 in vigour control, and CG.30 is likely to be a suitable replacement for M7. The AR86-1-20 rootstock was found to be well adapted to wide range of soils and climate and may replace other rootstocks in the semi-dwarf vigour category.



Production

Germany

The South Tyrol in northern Italy is the biggest apple growing area in Europe with about 18,000ha of production. Irrigation in this region is essential although its application is very subjective and at many locations much more water is used for irrigation than the apple trees actually need. With climate change there is a desire to protect natural resources and the efficient use of water is becoming a topic of concern. A study of soil water in the region has shown that tree water status is related to the level of groundwater and soil characteristics, and that surface soil compaction has led to slow water infiltration leading to long time lags between water application and availability to trees. This has shown that there is a need for "precision irrigation" based on objective instrumental data.

Germany

The fruit quality of Pinova apples in an orchard where the soil was mapped for high resolution geoelectrical properties, found that trees growing in water stressed zones had fewer leaves and smaller fruit with higher colour and TSS.

Canada

Extended periods of extremely cold winter climatic conditions regularly cause freeze damage to apple trees in Québec causing financial problems for growers. Using climate modelling it is predicted that the incidence of freeze damage to apples in this region will decrease with global warming.

Sweden

The main apple cultivars of Sweden - Aroma and Ingrid Marie - have poor colour and are susceptible to storage rots. It was found that application of reflective cloth under the trees prior to harvest and thinning of fruits in summer increased fruit colour, yield by 25%, fruit size by 16-17%, flesh firmness by 10%, and acid and sugar content by 25% in comparison with classic management. The fruit storability of these two cultivars was improved with reduced bull's eye rot.

Australia

In a study of Pink Lady™ apple production it was found that regulated deficit irrigation (RDI) (75%) imposed at late fruit development improved fruit skin colour, increased fruit sugars and firmness and slightly decreased fruit diameter and this effect persisted throughout fruit storage in air or CA.

Greece

An orchard was studied for three years and mapped for yield, fruit weight, skin colour, flesh firmness, sugar content, pH and acidity. It was found that firmness and sugar did not vary much across the orchard compared to fruit yield, fruit weight, acidity and skin colour.

USA

In studies of the use of Harvista (a field application formulation of SmartFresh®) it was found that overall, Harvista markedly delayed fruit drop in susceptible cultivars and resulted in lower internal ethylene concentrations and starch indices, and firmer fruit at harvest. The effects on quality factors such as firmness were maintained during air and CA storage, but the persistence of these effects were related to harvest maturity

China

Studies have commenced to study methods of conserving water in pear orchards.

China

A study of the use of a subsoiler in an apple orchard found that the soil bulk density was decreased; the soil porosity condition was improved; the water content in soil was enhanced within the top metre and the soil organic matter and soil total nitrogen was also enhanced.

China

A study was made using earthworms and iron impregnated straw. It was found that the earthworms could tolerate the straw treated with 20,000 mg/kg iron (the highest rate used) and effectively transfer the iron from the straw to the apple roots. Treated trees had increased new root growth and there was an improvement in the soil bulk density, soil pH, the pH value of the root cells and organic matter content of the soil.

Postharvest, handling and processing

Spain

Studies have been made with dielectric spectroscopy, which can be considered an emerging technology, as a means of non-destructively determining fruit maturity and it has been shown that the equipment has potential for this application.

Italy

An experiment on the effect of hydrocooling on three early harvest pear cultivars on post storage and simulated marketing fruit quality was investigated. Most of the fruit placed in a coldroom with a core temperature of 25°C were not marketable due to internal browning and fruit rots. In one cultivar internal breakdown was observed if fruit were hydrocooled to 5°C prior to storage and no problems were encountered in any cultivar if fruit were hydrocooled to 2°C prior to storage.

Germany

The vitamin C content of apples leading up to harvest and during storage was studied and it was found that the levels halved with storage for 3 weeks at 2°C, however, Retain® applied 4 weeks prior to harvest increased Vitamin C levels by 10% at harvest and SmartFresh® halved the rate of decline in the vitamin during storage.

New Zealand

A study of the relationship between fruit sugar, flesh firmness and fruit dry weight at harvest with consumer satisfaction of apples after storage has shown that fruit dry matter content (DMC) is the most reliable predictor of consumer preference.

Turkey

Turkey produces about 60 million tonnes of apples and exports only about 25,000 tonnes - a low percentage of the total crop. A study has been conducted to investigate the economics of cold storage of apples on marketing and price to demonstrate the potential of this alternative marketing strategy on apple exports from Turkey.

Australia

In a study of bruising of Pink Lady and Granny Smith apples it was found that apples harvested in the afternoon were less prone to bruising and Granny Smith were more susceptible to bruise at 5°C while Pink Lady was more susceptible at 12 to 20°C.

New Zealand

In a test of a pallet-scale Ethylene Release Canister* (ERCTM) it was found that the longer treatment times provided fruit that were distinctly more aromatic and flavourful than those conditioned conventionally. Covering for seven days had no detrimental effects on fruit quality and marketability. In autumn, warming

without ethylene failed to ripen Anjou pears acceptably. In winter, using controlled atmosphere (CA)-stored fruit, ethylene conditioning had little effect on rate of softening, but enhanced aroma and flavour. (*A device resembling an aerosol can but featuring a unique internal valve that releases compressed ethylene at a constant rate for an adjustable period of up to seven days. This can be used in conjunction with a standard polyethylene pallet cover to condition a pallet of packaged pears which permits in-transit conditioning).

USA

In a study of consumer preferences for Anjou pears it was found that consumers desired pears between 1.0 and 1.8kg firmness at the time of consumption. They defined an excellent quality pear as being sweet and juicy that will ripen within 4 days of purchase. They were prepared to pay an additional \$1.43/kg for conditioned pears in autumn although this dropped to 44c/kg in winter.

Poland

Adding high levels of calcium to apple cell wall material and then assessing the material for mechanical properties found that the addition of calcium decreased the forces needed for failure of the apple cell walls.

USA

In order to understand the response of Bartlett pear fruit to 1-MCP (SmartFresh) and their ability to recover the ability to ripen a study found that the ripening recovery depended on maturity and season.

Canada

Apple fruit were removed from CA storage and the stored for 0, 2 or 4 weeks in a coldroom prior to slicing and packing for fresh cut apple slices. Storage in the coldroom increased the rate of fruit browning although secondary browning and slice breakdown was reduced with 2 weeks storage in a cold room suggesting that this time in a coldroom is optimal for quality and shelf life of fresh cut apple slices.

New Zealand

In the past five years, browning symptoms at the calyx end of Braeburn, Royal Gala and SciEarly/Pacific Beauty™ apples have been observed during storage and following packing. A study of this has identified that the time fruit spend in chlorinated water following brushing affects the incidence and that a final rinse with potable water reduced the incidence. The problem was also related to the number of early and late calcium sprays used in the field.

Austria

Topaz apples were stored for 240 days under standard CA (1.5°C, O₂ 1.5%, CO₂ 3.0%) or dynamic controlled atmosphere (DCA) based on the fruit's fluorescence response to low oxygen stress and after 7 days at 20°C it was found that DCA storage maintained firmness and titratable acidity compared to CA and reduced browning disorders by 67% and reduced the incidence of *Gloeosporium* rot compared to fruits stored in CA. Neither low O₂ nor external CO₂ injury was observed in DCA.

Continued next month...▶

Pests and diseases

Canada

The rosy apple aphid *Dysaphis plantaginea* is a pest of economic importance to apple production, particularly in organic apple orchards where there are no acceptable controls. A study has shown that population densities on apple trees is dominantly related to the level of foliar nitrogen and tree age and that spring tree infestations are related to migration from plantain *Plantago* spp. on the orchard floor. The aphids prefer large low lying plantain leaves and close mowing prior to spring encourages these leaves and increases the number of aphids.

Italy

Trials with entomophilic nematodes (*Steinernema feltiae* and *S. carpocapsae*) against apple codling moth (*Cydia pomonella*) have shown significant differences in efficacy between the two species according to temperature at the time of application.

Romania

A survey of harmful insect pests in orchards using entomological nets, pheromone traps, light traps, food traps and visual methods found only a few species of high economic importance. The main pests recorded belonged to Lepidoptera and Homoptera and included *Aphis pomi*, *Dysaphis plantaginea*, *Yponomeuta malinellus* and *Cydia pomonella*.



International summerfruit research update

Compiled by Prof. Barry McGlasson, Technical Editor - Summerfruit



Resistance to Sharka

Silencing of plum pox virus, 5'UTR/PI sequence confers resistance to a wide range of PPV strains. Nicola-Negri, E. di et al. 2010.

Plant Cell Reports 29 (12), 1435-1444. The production of transgenic stone fruits resistant to PPV would take several years.

These authors used a test plant, *Nicotiana benthamiana*, to test the effectiveness of anti-virus constructs derived from an isolate of the M strain of PPV. They found that transformed test plants had complete long lasting resistance to several strains of PPV. One of these anti-virus constructs appeared to be particularly suitable for the development of stone fruit plants resistant to Sharka.

Control of Sharka by breeding. Hartmann WJ and Neumuller M 2010. *Acta Horticulturae* 874, 229-238.

A breeding program on plums is being conducted at Hohenheim Germany. Six tolerant or resistant cultivars produced in this program are in commercial production. Tolerant or resistant lines can be infected by PPV and continue to be a source of infection. The first absolute resistant cultivar 'Jojo' was introduced in 1999. This cultivar is hypersensitive to PPV and has continued to grow healthily for many years in totally infected orchards. In the breeding program quantitative and hypersensitive resistance have been combined. By pyramiding the genes responsible for quantitative and hypersensitive PPV resistance the investigators hope to obtain cultivars with durable absolute PPV resistance and high quality. Forty three clones with different fruits sizes and ripening times have been selected for testing in different production regions.

Agronomy

Rootstocks for controlling vigour of peach trees. Tombesi S et al. 2010. *Scientia Horticulture* doi:10.1016/j.scientia.2010.11.007.

In peach, anatomical characteristics of the xylem (water conducting tissue) have been shown to be related to the vigour of selected rootstocks. This work confirmed previous studies which showed that the vigour-control capacity of peach rootstocks is strongly related to their xylem hydraulic characteristics and that it would be possible to use xylem anatomical characteristics of shoots or roots of young trees to pre-select for size-controlling potential in a rootstock development program

Iron chlorosis. Álvarez-Fernández A 2010. *Environmental and Experimental Botany* doi:10.1016/j.envexpbot.2010.12.012.

The major effect of iron deficiency in peach and pear trees is a large reduction in yield. Fruit size increased with moderate chlorosis in both species but decreased with severe chlorosis in peach. Moderate or severe chlorosis affected all fruit in peach trees leading to firmer fruit with higher acidity, total phenolics and carboxylates.

Food Processing

Extraction of fruit juice Cendres A et al. 2010. *LWT-Food Science and Technology* doi:10.1016/j.lwt.2010.11.028.

An innovative laboratory scale process has been developed in France for the rapid extraction of juice from plums, grapes and apricots that are notoriously 'hard to press'. Best yields of juice were obtained by microwave heating of whole frozen fruit. The fruit tissue reaches 100°C, a temperature at which endogenous enzymes such as polyphenol oxidase are inactivated. Brightly coloured juices are drained from the microwaved fruit that were perceived to be fairly acidic and in the case of grape and plum some astringency was detectable.

Postharvest

Aroma of peaches following cold storage. Zhang B et al. 2010. *Postharvest Biology and Technology* doi:10.1016/j.postharbio.2010.09.012.

Fruit of a melting flesh peach cultivar were stored at 0, 5 and 8°C for up to 21 days. Data on emissions of characteristic aroma-related volatiles and related genes were collected. Fruit at 5°C were sensitive to chilling injury (CI) and had the lowest levels of volatiles, especially fruity notes such as esters and lactones. An electronic nose was used to evaluate peach aroma and the CI fruit could be separated from fruit stored at low temperatures that had not developed CI. Declines in the expression of three genes were associated with the reduced levels of volatiles in fruit with CI.

Dipping plums in an oxalic solution extends storage life. Wu F et al. 2010. *Food Research International* doi:10.1016/j.foodres.2010.12.027.

Dipping fruit of a Japanese-type plum in 3mM oxalic acid solution for 3 minutes delayed ripening in fruit stored at 25°C for 12 days or at 2°C for 20 days and subsequently at 25°C for 12 days.

Oxalic acid treatment reduced ethylene production and many physiological and biochemical changes associated with ethylene action. Further work is required on the effects of oxalic acid on shelf life of different cultivars and maturity of plum fruit is needed for commercial application. ■



Industry information & horticulture quiz

APFIP Weather Station Roundup



Know-how for Horticulture™

This project was facilitated by HAL in partnership with Apple & Pear Australia Limited and is funded by the apple and pear levy. The Australian Government provides matching funding for HAL's R&D activities.

Weather Station – Region	Average Temp Min	Average Temp Max	Rainfall for Month	Rainfall to Date 1st Jan
Report period: 12/11/2010 to 31/12/2010				
Batlow NSW	10.3	21.5	384	1855
Huon TAS	6.8	19	40.9	494.1
Lenswood SA	9.3	21.3	78.2	762.8
Manjimup WA	10.3	21.9	13.8	356.1
Goulburn VIC	12.6	25.8	130.7	716.9
Yarra Valley VIC	11.4	24.3	199.6	883.5
Orange NSW	11.5	21	405.9	1377.6
Stanthorpe QLD	12.6	20.1	244.6	823.1

This data is from the APFIP evaluation sites and may not be representative of the total district. Further weather reports and comprehensive variety evaluation reports can be found at the APFIP Australia website: www.apfip.com

Greg's Quiz

Question 1:

True or False: The blueberry and cranberry belong to the same genus of plants.

Question 2:

Which of these insects does not belong to the order Hemiptera (true bugs)? **A:** Lacewing. **B:** Aphid. **C:** Whitefly. **D:** Leafhopper.

Question 3:

What is the name of the lignified or fibrous protective coating of a seed?
A: Kernel. **B:** Stone. **C:** Ovule. **D:** Testa.

Question 4:

The old apple variety 'Astrakhan' is named for a city in which country?
A: Turkey. **B:** USA. **C:** Russia. **D:** Ukraine.

Question 5:

From which species of pear was the commonly used seedling D6 selected?

- A:** *Pyrus communis*.
- B:** *Pyrus pashia*.
- C:** *Pyrus betulifolia*.
- D:** *Pyrus calleryana*.



Answers:
Question 1 - Answer: True
Question 2 - Answer: A: Lacewing
Question 3 - Answer: D: Testa
Question 4 - Answer: C: Russia
Question 5 - Answer: D: *Pyrus calleryana*

Quiz supplied by Greg Cramond, SA

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