



newsletter coastalfruitgrowers'

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Dear Growers

Welcome to the combined Spring/Summer issue of the Newsletter – the final for 2009.

Inside this issue you'll find some very interesting results on the apparent change in flowering times of citrus over the past 18 years at our Dareton Research Station – a consequence of our progressively warmer weather. This article is quiet timely as it follows the prolonged heat wave conditions recently experienced across central and south-eastern Australia. Starting in early November, temperatures of >35°C were experienced in many southern citrus growing regions for an unprecedented 9 days straight coinciding with the fruit-set period of many citrus varieties. What impact this will have on the 2010 crop is only just coming to light now, as growers start to assess crop loads following the completion of the 'natural fruit drop' period. If you would like to read more about this heatwave event, the Bureau of Meterology produced a special climate statement (No. 19) available on their website at www.bom.gov.au.

For avocado growers I have put together a key pest and disease management guide that summarises current best practice tips and control strategies. And for stonefruit growers there's a very detailed report on the research being done by Queensland Primary Industries on tree training systems for low-chill stonefruit.

There's also lots more interesting articles and updates – just take a look at what's inside!

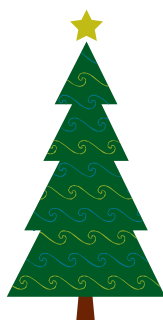
I'd like to also take this opportunity to wish you all a very Happy Christmas.

See you in the New Year.

Sandra Hardy



Industry &
Investment



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THE COASTAL FRUITGROWERS' NEWSLETTER

The Coastal Fruitgrowers' Newsletter is produced by Industry & Investment NSW and distributed electronically, 2-4 times a year.

The quarterly Coastal Fruitgrowers Newsletter was first published in 1991 and circulated to all NSW coastal fruit growers.

In 2008, after 70 issues, the Newsletter went totally electronic and is now only distributed by email. The Newsletter is also available at <http://www.dpi.nsw.gov.au/aboutus/resources/periodicals/newsletters/coastal-fruitgrowers>

CONTRIBUTIONS

Letters and stories from commercial growers and industry personnel always welcome.

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New varieties, technology and collaborative marketing key to grower profitability

Source: Citrus Australia, 13 November 2009

Australia's 2,000 citrus growers will be able to access new citrus varieties however access to the new varieties will come at a cost as commercialisers try to recover their investment in R&D.

Citrus Australia Ltd, the national peak body for the Citrus Industry, held its annual conference in Mildura over 9-11 November this week. The focus of the conference was on the commercialisation of new varieties, biosecurity and grower profitability. Keynote speaker at the conference, Dr Etienne Rabe, the Vice President of Paramount Citrus, the largest grower and packer of citrus in California, says the days of free new varieties are numbered. "Australia – as one of the highest cost countries – needs to focus on the newest technology and varieties to gain advantage."

The Australian market will see an influx of new citrus varieties from the international market and from the domestic market which has had the support of organisations like the CSIRO.

Citrus growers who want to access the new varieties will have to come to grips with new management and marketing models including tree royalties, production royalties or combination tree-production royalties that can be levied per carton or annually per hectare based on a formula. Any production royalty is premised on a new selection



generating a price premium, something which is by no means guaranteed.

CEO Judith Damiani said: "Australian citrus growers will have to be proactive and carefully consider what is on offer. The speakers certainly highlighted some exciting new citrus varieties coming our way. Through our industry research facilitated by Horticulture Australia Limited which includes varietal evaluation and consumer research, Citrus Australia can help guide growers on which varieties are more likely to achieve better consumer returns."

For more information, interview opportunities and images, please contact: Helen Piscioneri, Citrus Australia, Communications Officer, 03 5023 6333 / helen.piscioneri@citrusaustralia.com.au



National Stonefruit Conference

"Opportunities from Adversity"

Ballina
Wednesday 28 April to Friday 30 April 2010

Climate is affecting citrus development

T. Khurshid, Research Horticulturist, I&I NSW, Dareton

Citrus is a tropical crop and is produced commercially in over 30 countries worldwide. The major citrus growing regions are found between latitudes 20° and 40° North or South. Being tropical, citrus can tolerate minor changes in temperature, but extreme temperatures experienced during different phenological stages can affect fruit production in the current season, and impact the next season's crop.

Observations of flowering behaviour have been made by Dr Tahir Khurshid's team on the same group of Washington Navel oranges on the same block at NSW Industry and Investment's Dareton Primary Industries Institute for the last 15

years. The data clearly indicate we are experiencing earlier springs. Historically, full flowering for Washington navels in the Sunraysia and Riverland is mid-October, however, for the last few years full bloom dates have been occurring at the beginning of October, 10 to 14 days earlier (Figure 1). Full bloom in the current season was September 22, the earliest date recorded in the last 18 years. It is not possible to conclude from only these observations that climate change is real. On the other hand, the other changes in rainfall and temperature patterns certainly suggest that the climate is changing, and that it is affecting citrus tree behaviour.

Dr Khurshid has predicted that by year 2020 the growing season in Sunraysia could have approximately

2100 heat units compared to the current 1800, and that there could be 47 days above 40°C compared to the current average of 14. However this high temperature profile is still below that experienced in some citrus producing regions around the world, for example Pakistan, which predominantly grows Kinnow mandarins.

If the trend toward warmer weather continues and extreme temperatures during the fruit set period in November are experienced, large numbers of fruit could abort – reducing yield. Fruit abortion is triggered by a few days of temperatures above 40°C during fruit set.

Extreme heat not only causes yield losses but can also affect internal and external fruit quality. In February 2004 three days of above 40°C

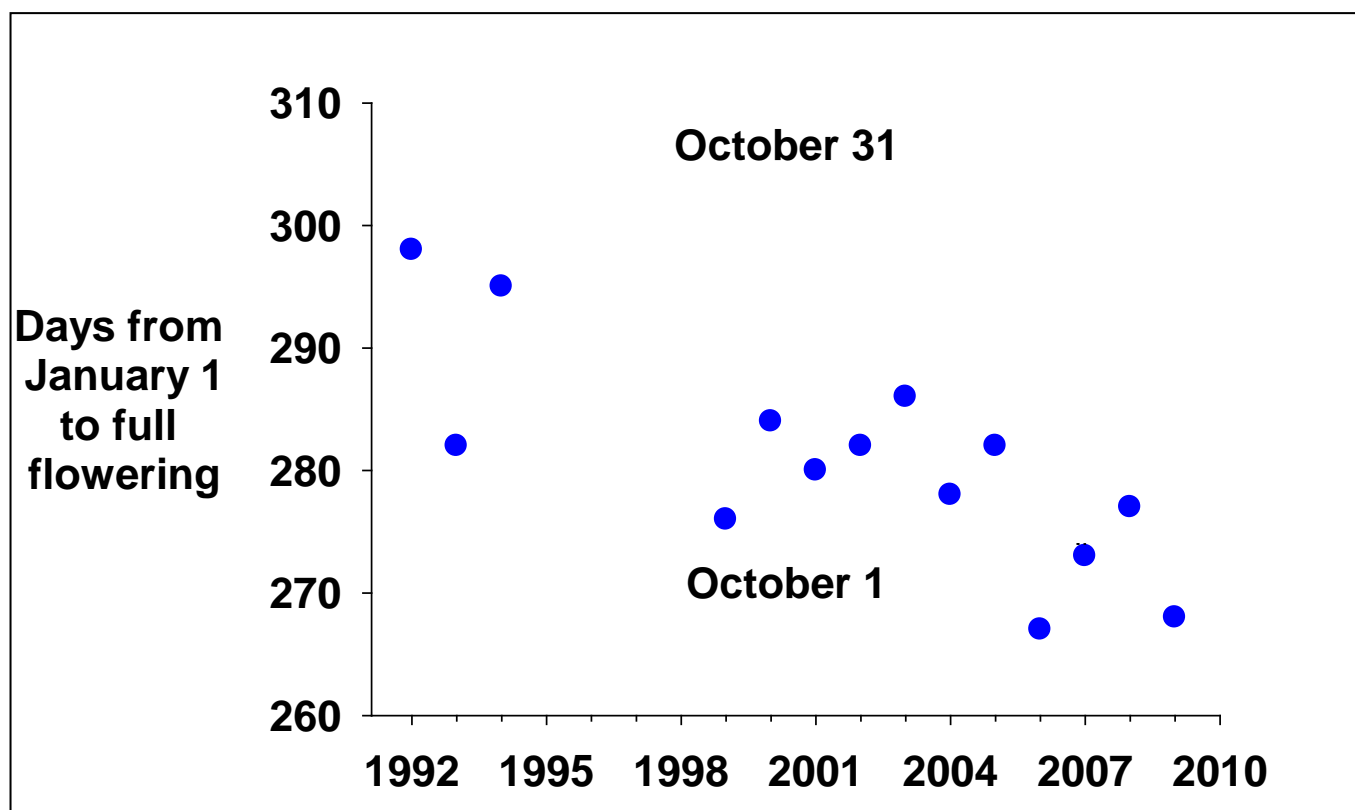


Figure 1: Date of full bloom in a block of Washington navel oranges at the Dareton Primary Industries Institute 1992-2009.

temperatures caused sunburn damage to exposed fruit at Dareton. In February 2009, there were 13 days above 40°C causing not only sunburn damage to fruit, but also leaf damage. Heat-related leaf damage has not been seen in the last decade. Dr Khurshid's climate modelling work predicts 47 days above 40°C in 2020 (compared to the current average of 14). Strategies such as changes to canopy management or applying sun protectants will need to be developed to protect fruit from damage. In Pakistan Kinnow mandarins are grown on more vigorous rootstocks such as Rough Lemon which grows larger canopies and provides some degree of protection against sunburn.

Depending on the phenological stage, extreme heat or consecutively hot days can affect citrus fruit. Fruit colour in blood oranges is related to the development of anthocyanins in the fruit segments. Generally, cool days and cooler nights during July and August are required for the fruit to develop good colour. The need for cooler temperatures is defined as chill units, which has been calculated as the number of hours between 5–10°C during the July/August period. In the winter of 2004, hot days and warm nights were experienced, and only 456 chill units were recorded. Figure 2 shows that for that year a range of blood orange varieties failed to meet the desired colour. It can be noted too from Figure 2 that the chill unit requirements of the different blood orange selections differ. In the winter of 2008 there were a total of chill units of 576, and fruit did reach the required colour. In the current season we have experienced another warm winter and once again blood orange fruit failed to achieve good colour.



Figure 2: Colour development in blood oranges in 2004. Varieties from left to right are: Ruby Blood, Sanguine, Harvard Blood, Maltese Blood and on the bottom row: Arnold Blood.

These few examples show that the affects of climate change could be significant on the citrus industry in this region in the future. It should also be clear that the impacts of the altered temperatures will be dependant on the timing of these changes relative to crop phenology.



Exposed fruit were sunburnt in February 2009 following a period of 40°C temperatures at Dareton.



Sun protectants may have to be applied to fruit in the future if the number & duration of temperature extremes increase.

Dr Khurshid is currently leading an ACIAR (Australian Centre for International Citrus Research) project titled "Increasing citrus production in Pakistan and Australia through improved orchard management techniques". The project is focussed on crop management techniques and developing an understanding of the phenology of different varieties in both countries. A range of public varieties have been sent to Pakistan to assess their growth and performance in the Sargodha citrus producing region. There are 4 times more days with maximum temperatures above 40°C in Sargodha than Sunraysia. The benefits of testing these citrus varieties in the hottest climate of Pakistan are beneficial to both Pakistan and Australia. The Pakistani citrus industry relies on a very limited number of varieties, so these newly introduced public varieties may help extend the Pakistani industry's marketing opportunities if the varieties are successful. The benefit to Australia of this work is that more information on how these varieties perform under very hot conditions of Pakistan will be obtained. This will be a significant advantage to the Australian citrus industry as the climate changes.

Visit to Jemalong Citrus at Forbes



Sandra Hardy, Cittgroup coordinator – Coastal NSW

In September I was lucky enough to join in with a CITTgroup bus tour to Jemalong Citrus organised by Riverina Citrus. Jemalong Citrus is located about 20 minutes south west of Forbes in central NSW. Farm manager, Pierre Van Rensburg, gave us a tour of the property and Andrew Nelson was demonstrating the Nelson mechanical harvester in a block of young Hamlin oranges.

The farm has been developed in five stages, starting with an evaluation block of mixed citrus varieties in late 2005. The last stage of planting will commence in spring 2009. In total there will be 260, hectares of mostly juicing varieties. The main advantages of this development have been in its size and therefore economies of scale; use of advanced fertigation and mechanical harvesting. The fruit is trucked to Melbourne for processing and needs to be received within 12–24 hours, before breakdown starts in split fruit.

Irrigation

The main source of water at present is bore water which has good quality in terms of EC and pH. The irrigation system has been designed to also use the river as a water source in the future. The bore water is pumped overnight into a 10 ML holding pond which has been lined to prevent leakage. The water is pressurised after it leaves the pond. The main reasons for pumping the water into



The 10 ML holding pond



Fertigation system

the holding pond is to reduce costs, by taking advantage of night time off-peak power rates and to also reduce the capacity/size of the pump required. The trees when fully mature are expected to need around 8 ML/day during the peak demand period of December to February. Trees are irrigated during the day. Two panting stages can be irrigated simultaneously. The pump system is modular with components able to be added as required. Trees are drip irrigated, with one line put in at planting and a second line added in the 3rd year.

Fertigation

Water is filtered as it comes into the shed and split. Each block has its own main line so it can be managed separately and two injection points mainly to separate the incompatible nutrients such as phosphorous and calcium. The injection system has five output channels and has high flow output with the capacity to deliver 1000 L/hr/channel. In the near future the nutrient solutions will be delivered in bulk.

Growing systems

On the farm they have set up two test growing systems (each about 8 hectares in size), open-hydroponics and a biological system called the “bio-block”.

They have been monitoring 10 trees per block monthly, undertaking a range of tests including monthly leaf analysis, SAP, pH °Brix and trunk diameter. Tree growth and condition have been similar but yield and fruit set

have been lower in the bio-block. They have excavated trees in each system and visually the trees root system looked bigger in the bio-block. They still use conventional herbicide in the bio-block.

On the bio-block one of the main issues has been how to supply enough units of nitrogen using organic sources but still keeping costs in check. For young trees they are aiming to supply about 30 units of N/tree. They have used a range of nitrogen fertilisers including blood and bone and fish. They have also been using two applications of Twin N (spring and summer) in the fertigation system to help with nitrogen fixation, hoping to reduce the N units by half. The cost of Twin N has worked out at about \$30/ha. They have been using an organic form of potassium citrate (35% K) as a foliar spray to supply the potassium. In the first 2 years they applied compost and mineral blends, but have now stopped the mineral blends. Lower fruit set has been an issue in the bio-block.

The visit was organised to coincide with mechanical harvesting of a block of Hamlin oranges, where the fruit was a bit difficult to remove. Trees are on citrange rootstock which may be contributing to the fruit being difficult to remove. Trees were sprayed with ethephon (80 ml/100L @1000 Lwater/ha) 2 weeks prior to harvest to help loosen the fruit. At present mechanical harvesting costs are working out at around \$80/tonne, but is projected to drop to \$50/tonne as trees grow bigger and yields increase.



The Nelson harvester in operation

Currently the machine does 5 T/hr with 1 bin and needs 16m of headland to comfortably turn. Modifications undertaken on the machine include:

- the addition of cameras so the operator can watch the back of the machine
- a new overhead sizer to take out the small fruit, trash and out of season fruit

Development and improvement work on the harvest machine is ongoing. Future modifications will address fruit with stems and split fruit. A modification to the conveying system should enable the harvester to handle larger volumes of fruit from older trees.



Trees before (left) and after the Nelson harvester moves through the row.

Evaluating new varieties and ensuring healthy budwood



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Industry & Investment

This is the technical summary extracted from the final report of project CT04003 prepared by Graeme Sanderson & Nerida Donovan, Industry and Investment NSW and Tim Herrmann, Auscitrus.

The 'National evaluation of new citrus varieties and maintenance of high health status budwood' project is a continuance of the Australian Citrus Improvement Program. This long term program is an industry driven initiative aimed at maintaining industry productivity and profitability. Thirty one new citrus varieties have been introduced to Australia in recent years with 20 having Plant Breeders Rights (PBR) protection and 11 available as public access through Auscitrus. A cooperative arrangement was developed between Auscitrus, Horticulture Australia Ltd (HAL), the Department of Industry and Investment NSW and variety managers to have these varieties independently evaluated in Australia. The new varieties were also included in the citrus repositories at the Elizabeth Macarthur Agricultural Institute (EMAI) for future supply of 'true to type' high health status budwood.

The 'staggered' release of new varieties from Australian Plant Quarantine has required a number of propagation phases to establish trees in the field. Trees are planted at all sites on Troyer citrange for comparison purposes as well as a second rootstock chosen to suit the soil conditions. These stocks include *Citrus trifoliata*, Swingle citrumelo, Cleopatra mandarin, C 35 citrange and Volkameriana. The Sunraysia site also has the varieties grafted onto mature Valencia orange trees to generate a larger volume of fruit for grading and test marketing.

Nine of the varieties planted in October 2005 produced a small volume of field fruit at the Sunraysia and Riverina sites in 2008 and this has been quality tested. Samples of the varieties were also provided to the Australian Nurseryman's Fruit Improvement Company (ANFIC) for preliminary market comment. The fruiting varieties in 2008 included: Mor, Nectar, Nouvelle, Cami and Mandalate mandarins, Sidi Aissa and Orogrande



C 1867 crop load in June 2009 on a 4 year old tree grafted to Valencia orange with an understock of C. trifoliata.

clementines and Eureka seedless lemon. The 4 Italian triploid mandarins (Alkantara, C 1867, C 1829 and Tacle) have been slow to come into bearing and produced fruit for the first time in 2009. The 6 varieties planted and grafted in 2006 have produced field fruit for assessment in 2009. These are: Primosole, IRM1, IRM2, Or, Gold Nugget mandarins and Nour clementine and are being sequentially tested to determine fruit quality and maturity period.

The program also involves the establishment of container grown mother trees and the regular checking of their health status. These 'elite' trees are maintained in insect proof screen houses and are the source material for future rapid multiplication of budwood for tree propagation. The evaluation component of the project is based on comparing the performance of the new varieties in a range of citrus growing regions across Australia with different climates, soil types and management regimes. Data is collected on 'trueness to type', fruit quality, maturity period, phenology and tree growth rate which is then compiled into draft information sheets.

The PBR and public access varieties have been displayed as fruit to general citrus audiences at grower meetings in

each state. Selected groups have viewed field evaluation sites in the company of the project coordinator and variety managers. Variety road shows have also been conducted to introduce the new PBR varieties to prospective growers. Fruit samples of the new varieties have also been sent to market agents for assessment and comment. Varieties which have produced fruit at the evaluation sites and are creating commercial interest are: Alkantara, C 1867, Nectar, Mor, IRM1, IRM2, Gold Nugget, Mandalate and Eureka seedless lemon. A further 6 varieties are predicted to crop for the first time in 2010 increasing the fruiting total to 25 of the 31 varieties originally introduced to Australia.

The evaluation program is also trialing crop management techniques on varieties with potential to be commercialised in Australia. The Sunraysia site has 12 trees of each new variety grafted to mature Valencia orange trees and this allows the early development of a large canopy and high crop loads.



Mandalate mandarin



C 1867 mandarin

C 1867 grafted to Valencia on *C. trifoliata* produced an average of 46.6 kg of fruit per tree, four years from grafting, which was used for grower displays, cool storage experiments and sequential juice quality testing. Grafted trees have also provided sufficient fruit to grade and determine fruit size distributions on several varieties in 2009.

Nectar trees grafted to Valencia on citrange rootstock had an average yield per tree of 43.7 kg but an average fruit weight of only 70 gms. Fruit thinning removed an average of 1104 fruit per tree with 625 fruit per tree collected at harvest. Fruit size for this variety is a management issue and has also been highlighted in overseas information. The 64% thinning rate on the grafted evaluation trees did not improve fruit size at harvest in 2009. Tree canopy management, earlier removal of fruitlets and the use of chemical thinning and sizing sprays will be trialed in 2010. Nectar reacted positively to gibberellic acid (GA) sprays to slow rind aging and achieved a larger natural fruitsize in the more sub-tropical growing conditions at the Queensland evaluation site.

Mandalate is another variety identified with commercial potential and has characteristics in common with the Imperial mandarin but is significantly later to mature. Testing in 2009 is concentrating on increasing fruit size, maintaining skin condition with GA and the use of the growth regulator Cit-tite® to retain fruit on the tree for an extended period. Fruit must be held on the tree for the high acid content to reduce and improve palatability. Mandalate should not be grown on *C. trifoliata* especially in clay soil types or cooler regions as this rootstock can induce a higher acid content in the fruit. The Riverina evaluation site was not able to grow Mandalate with acceptable eating quality due to the consistently high acid content in fruit from trees on *C. trifoliata* rootstock.

Independent variety evaluation can assist Australian citrus growers to make more informed decisions when selecting new citrus varieties. The increasing dominance of PBR varieties with attached minimum area and royalty structures makes it imperative that decisions are based on best available information. Overseas performance data can assist in the selection process but local results should form the basis of any long term investment in new varieties. The continuance of support for the maintenance and health status testing of citrus varieties along with rapid, independent evaluation of new introductions to Australia should remain an industry priority.

Recommendations

- Industry support and funding should continue for the maintenance and testing of high health mother trees. These trees form the basis of a disease free and 'true to type' budwood distribution scheme. If a severe disease incursion happens in Australia, as has occurred in Florida with Huanglongbing, these trees will provide the healthy plant material for industry replanting and long term survival.
- Independent variety evaluation should be seen as a priority for the Australian citrus industry. Horticultural performance information from different climatic zones allows more informed decisions to be made when selecting new citrus varieties. The increasing dominance of Plant Breeders Rights (PBR) varieties makes the decision making process more critical for the citrus grower. Royalty structures and minimum hectares to be planted are the requirements for entering 'grower club' arrangements with Variety Managers. It would be preferable for Australian growers to enter these relationships with independent, local horticultural performance data rather than only overseas production information.
- Industry and Investment NSW at the Agricultural Research and Advisory Station, Dareton have the lead agency role in future national evaluation of new citrus varieties. The site has the land, infrastructure and experience to undertake variety evaluations for the Australian citrus industry.
- Maintain relationships with Variety Managers to allow the independent evaluation of private varieties.
- Encourage Variety Managers to remain within the Auscitrus system for mother tree establishment, in secure repositories, and budwood multiplication.
- Auscitrus continue the importation of selected public access varieties to fill niche market opportunities for the Australia industry.

Acknowledgements

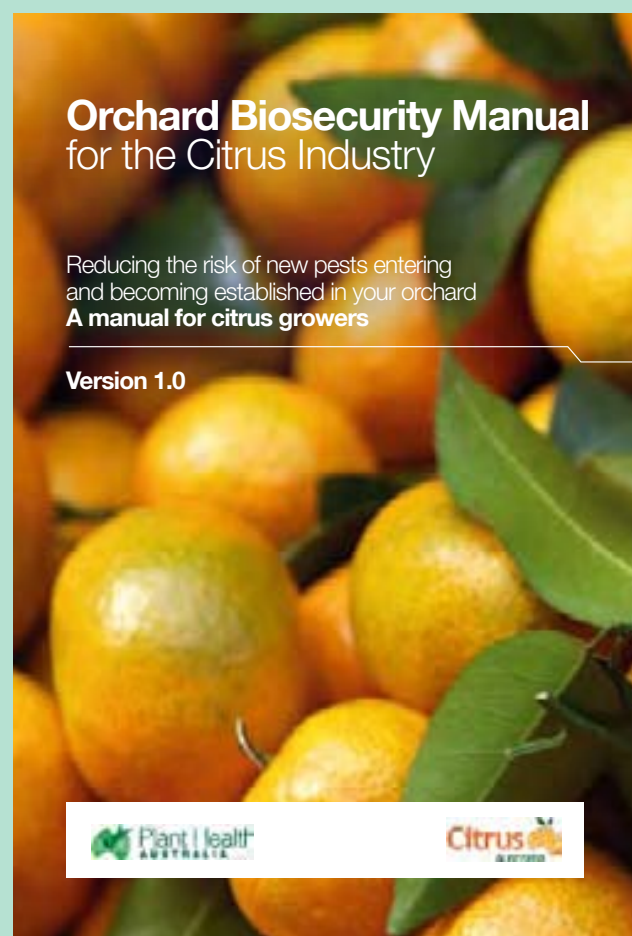
We wish to acknowledge the commitment, support and expertise of Troy Witte, Jason Bowes and Kate Witte (Technical Assistants – I&I NSW) in conducting the variety evaluation component of this project.

A full copy of this report is available from Horticulture Australia Limited, phone 02 8295 2300.

New Citrus Orchard Biosecurity manual

“Finding exotic pests or diseases early is important - awareness is the key to eradication” – New Citrus Orchard Biosecurity Manual launched.

With an aim of assisting the citrus industry prepare for biosecurity threats, a new Orchard Biosecurity Manual and an updated Citrus Industry Biosecurity Plan were launched at the recent national citrus conference in Mildura.



The manual is designed to help growers protect their orchards by regularly checking plant material, making workers aware of biosecurity measures and cleaning vehicles and equipment.

For more information on the Farm Biosecurity program visit www.farmbiosecurity.com.au

Brilliance in a tin shed at Dareton

Source: November 2009 edition of *Agriculture Today*.

A replanting program at Dareton Primary Industries Institute has established five hectares of new navel oranges, young planted blocks that will provide a resource for revenue, trial and grower extension activities.

Australia's key citrus production research facility conducts evaluations of new citrus rootstocks and varieties, plant nutrient and soil water management, and international co-operative programs.

In these times, the main focus of these current horticultural research and extension projects incorporates drought survival, recovery and irrigation training to an advanced level for NSW growers.

In 2010, several superior *Citrus trifoliata* selections of native citrus types from China, such as Tange, Donghai and Zao Yang will go to second stage evaluations in the Riverina region, as part of Dareton's international program. These are being assessed for their suitability as rootstocks to improve yield, fruit quality, disease resistance and salt tolerance.

The Australian Centre for International Agricultural Research (ACIAR) and Horticulture Australia Ltd (HAL), have supported an ongoing relationship with China since the late 1980s to evaluate a range of their native citrus types in Australia.

International collaborations have also progressed for several years in Pakistan and Bhutan.

The Institute also provides a strong extension function to the region with specialist extension officers for citrus, grapevines, vegetables, irrigation, agronomy and rangelands.

Though the station's capital resources are down to bare bones in tough economic times with grim climate, a recent review by the former NSW Department of Primary Industries reconfirmed citrus as a horticultural industry of major benefit to the State.

The national trend is for the contraction of government research and extension functions to agricultural producers.

"However, horticultural research and extension units need to maintain a critical mass to effectively compete



Research horticulturist Graeme Sanderson with growers viewing public access new citrus varieties, on a recent farm walk at Dareton

for government and industry funding support," long time researcher at Dareton, Graeme Sanderson, said.

Citrus research and extension capacity within the newly created Industry and Investment NSW is the most significant of any State and provides strong support to the Australian industry which had export earnings in 2008 of \$156m.

The success of the Dareton station and staff is demonstrated by the \$6.6m of research money attracted to the facility since 1998. In addition to HAL and ACIAR, other major funding sources have been the National Program for Sustainable Irrigation, and the Murray Darling Basin Commission.

The Dareton Primary Industries Institute occupies 243 hectares with trials, industry budwood schemes and commercial plantings comprising 56ha of the total area. Researchers commonly retain completed citrus trials and impose other experiments on them, to lower setup costs and help make them a more attractive funding option for industry. All plantings are irrigated by predominantly drip or under tree sprinkler systems and water volumes applied determined by a range of devices such as EnviroScan soil moisture probes.

The station is located in the far south west corner of NSW, 25 kilometres from Mildura, in the centre the Sunraysia citrus and grape production region.

Strategies to prevent fungicide resistance in citrus packing sheds

Peter Taverner, SARDI

Extracted from the Packer Newsletter, Volume 94, September 2009

Australian packers have been relatively free of fungicide resistance issues, but, in recent years, some changes in practices have increased the risk. The move to exports all year round has meant that the same fungicide groups are used all year round. In addition, treated fruit can be held in cool rooms on the premises for long periods of time waiting for improved market prices. Contamination occurs when treated fruit, which is mouldy, is brought out of storage, re-run and packed.

These sorts of practices increase the risk of problems occurring, and when coupled with increased decay failure in markets; is a disturbing trend. On the positive side, there are new fungicide groups being registered for postharvest use on citrus, which should help alleviate resistance issues, if they are managed properly. As such, it is timely to consider the principles for prevention and control of mould resistance to postharvest fungicides.

How does fungicide resistance develop?

In any fungal population a small percentage, usually less than 1% of spores will be 'naturally' resistant to some fungicides. Whether these resistance spores gradually increase depends on the way in which fungicides are used and the fruit is handled. If the same type of fungicide is used constantly, and, particularly, when the rates or application methods are below standard, the resistant spores can increase at the expense of the susceptible spores.

How does resistance to TBZ develop?

Thiabendazole (TBZ) belongs to the benzimidazole group, which includes benomyl (Benlate), thiophanate methyl (Topsin) and carbendazim (Bavistin). All these fungicides have the same mode of action and resistance to one is likely to result in resistance to all fungicides in this group.

In many parts of the world, carbendazim is used to control black spot in citrus orchards. Continuous use over a number of seasons can lead to resistance in the field, which can then be transferred as high numbers of resistant spores on fruit into the packingshed. Although

the spores have not been in contact with TBZ they are predisposed to resistance because the mode of action of the two fungicides are the same.

The use of fungicides in citrus orchards in the Australia is usually limited to different groups, such as copper formulations. Carbendazim may be used in nearby crops, such as grape vines, but the potential for resistant to develop from associated spray drift is unknown.

Resistance can also develop within the packingshed environment. (See IMZ resistance below.)

How does resistance to Imazalil (IMZ) develop?

The natural frequency of mould spores resistant to IMZ is rare in orchards because IMZ is not used in the orchard. As such, any increase in IMZ resistance is likely to be due to the cross-contamination of resistant mould spores from decayed fungicide-treated fruit held in storage on the premises. Therefore, the strategies for resistance management are focussed on the packingshed.

Strategies to prevent a resistance problem

Prevention is better than cure, and the following principles should be understood and managed to reduce the risk of fungicide resistance.

Pre-harvest control

It is desirable to use fungicides with different modes of action in the orchard and the packingshed.

Orchard hygiene

A certain number of spores is required in a wound to cause a fruit to rot. It is important to keep the total spore load in the orchard to a minimum. Pruning to increase airflow reduces humidity and therefore, provides poor conditions for spore development. In South Africa, fallen fruit are removed from the orchard floor in TBZ resistant areas before they can sporulate. Alternatively, the use of 2,4-D can substantially reduce fruit drop. The use of chemical sprays in the orchard to sanitise fruit has been trialed in a number of countries, but good coverage is an issue.

Harvest carefully

The careful handling of fruit can reduce the injury sites where spores would germinate. Fallen fruit should never be harvested into bins.

Prompt treatment after harvest

Fruit should be sent to the packing shed and treated with a fungicide within 24 hours of harvest. This should prevent viable spore-loaded fruit going into the packing shed.

Dry dumping and early sorting

During the dry dumping process any spores on fruit are liberated into the air. If field resistance is suspected, or treated fruit is being re-run, then the use of extractors to exhaust spore-contaminated air out of the shed is warranted. Alternatively, chlorinated mists directly over tipping bins can reduce spore loads into the air. In addition, the early removal of rotting and split fruit from the line is highly desirable. The culled fruit if sporulating should be treated with chlorine or quaternary ammonium compounds to dampen spore movement into the air.

Chlorination of fruit washing processes

Washing must reduce the spore load on fruit and the water or brush-beds should not become a source of contamination. The use of chlorination of all solutions is highly recommended; as is the use of high-pressure washing. Brush-beds are complex surfaces to sanitise and will require thorough (eg. hot water under pressure) and frequent cleaning before application of a sanitiser, such as a quaternary ammonium compound.

Using mixtures of fungicides

Where resistance is a concern, mixing fungicides with different modes of action is considered to greatly retard the onset of resistance problems. However, eventually it may lead to double resistance. Mixing is a risky long-term strategy when you use all your different groups in one mixture, such as occurs in many packing sheds in Australia. Alternating fungicide groups is considered a more effective strategy (Holmes and Eckert, 1999), but may not be very practical when only a few groups are allowed for export markets.

Alternation of fungicides

Generally when a fungicide is removed the susceptible spores will out compete the resistant spores. This allows you to remove the fungicide at risk (eg. TBZ) and replace it with another fungicide with a different mode of action (eg. guazatine) until the number of resistance spores are very low, and then re-introduce the first fungicide (TBZ) and withdrawing the second one (guazatine). In Australia, it may be possible to remove either carbendazim or imazalil from the packingline

process when guazatine is used. The monitoring of spore resistance may indicate any improvements using this approach. However, guazatine is unacceptable to many overseas markets, which limits this approach. New fungicide groups have been registered overseas and their use should flow through to Australia eventually. It would be sensible to manage the introduction of new fungicide groups in an alternating pattern with existing groups.

Hygiene and sanitation in the packing shed

The production of spores on fungicide-treated fruit within the packing shed should be avoided at all costs. Fungicide-treated culled fruit should be destroyed or removed before spores develop. Ideally, treated fruit should be packed and out the door to market before any decay can develop. Usually, this is the case, but not always. If you or your marketing division chooses to hold fruit, they should be aware of the consequences. The re-packing of sporulating fungicide-treated fruit liberates resistant spores into the packing shed. All fruit entering the packingline is now at a much higher risk of inoculation by resistant spores. The problem will compound over the season unless hygiene is scrupulous. To avoid problems, a thorough clean up and sanitising of the entire packing shed should immediately follow re-packing this type of fruit. The sporulation of fungicide-treated fruit in the cold storage area will also require thorough sanitation or fumigation of all contaminated surfaces to reduce the risk of harbouring resistant spores.

The entire packing shed should be cleaned every day, and fallen fruit collected and destroyed. The packing line should be sanitised every evening, with 2,000 ppm quaternary ammonium spray or equivalent. The use of chemicals with a mild fumigant action for sanitising cool storage and degreening rooms is also highly recommended.

Improved treatments for the control of resistance mould stains

The above strategies are important in minimise the risk of resistance problems occurring. However, there are approaches and treatments that will assist in the control of existing problems. They involve the use of heated solutions and chemicals with generalist or alternative modes of action (eg. carbonate salts), and combinations of these treatments.

In regard to postharvest drenching, Smilanick and co-workers (2006) showed that a combination of 3% sodium

bicarbonate, TBZ (350 ppm) and sodium hypochlorite (200 ppm) at 13°C improved the control of a TBZ-resistant mould strain. Heating the solution to 41°C also resulted in significant improvement. Similar improvements are likely for in-line application.

In summary, Australia has had isolated rather than systemic fungicide resistance in citrus packingsheds. However, the risks have increased with more treated fruit held on the premises and less fungicide groups available for use on fruit. The arrival of new postharvest fungicide groups is welcome, but let's manage their use carefully. An understanding of the principles of resistance will help to develop strategies to maintain the effectiveness of these fungicides for much longer.

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The Packer Newsletter is available on the SARDI website at http://www.sardi.sa.gov.au/foodinnovation/publications/citrus_packer_newsletter

Age related breakdown of mature navels

Source: SA Citrus Board newsletter, 30 October 2009

Packing sheds are reporting problems due to age related breakdown in late season navels. The symptoms don't appear until 10-15 days after picking and can vary, but are usually:

- discoloured, dried out and extensive collapse of rind
- dehydration or wilting at the stem end where the rind is thinnest

Navels are more likely to show symptoms at the end of the season. However, some on farm conditions can accelerate the incidence such as:

- heavy rains plus high humidity, followed by a frost
- dehydration of fruit in the orchards by hot conditions
- holding fruit too long between harvesting and packing (low humidity storage in shed)
- warm, dry conditions when trees are under water stress leading to dehydration of the stem end of fruit

To minimise the chance of your fruit being affected by this physiological disorder ensure that adequate water is delivered to citrus trees throughout the growing season, especially during periods of prolonged hot weather.

Biosecurity information videos released

Source: DAFF09/009D, 6 August 2009

The Department of Agriculture, Fisheries & Forestry has released six short videos providing important biosecurity information to primary producers and landholders. They provide basic tips, actions and details on where to get more information.

Chief Plant Protection Officer Lois Ransom said the videos would remind plant producers as well as their workers and visitors of the importance of biosecurity on their properties.

"Plant producers take their role in biosecurity very seriously and these videos will help them to consider it in all activities on their properties. Australia maintains an international competitive advantage when it comes to pests and diseases – and practising good biosecurity will maintain this advantage," said Ms Ransom.

"We saw how outbreaks such as citrus canker in Queensland in 2004 and equine influenza in 2007 affected not only the producers or horse owners but businesses and individuals associated with those industries. If producers make biosecurity a regular part of their operations, authorities will be alerted earlier to outbreaks and will be able to better manage them when they do occur."

Biosecurity topics covered include animals, plants, farm workers, equipment and considerations for small farm holders.

The videos are also available on DVD. The videos are available on the Department of Agriculture, Fisheries and Forestry website at www.daff.gov.au/biosecurity.

IMPACT OF INSECTICIDES ON NATURAL ENEMIES IN CITRUS

Information provided is based on the current best information available from research data.

Users of insecticides should check the label for registration in their particular Crop & State, and for rates, pest spectrum, safe handling and application details.

INSECTICIDES	TOXIC EFFECT ON SPECIFIC NATURAL ENEMIES*										RATING OF INSECTICIDE IMPACT ON NATURAL ENEMIES OVERALL**			
	Predatory Mites		Parasitic Wasps	Predatory Beetles	Predatory Bugs	Lacewings	Spiders	Parasitic Nematodes for insect control	The Natural Enemies Assessed;					
Active Ingredient	Soil	Foliar												Predatory Mites, Larval, and Pupal Parasitoids
Bacillus thuringiensis (Various registered products)	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	★★★★SOFTEST
Oils (Various registered products)	L	M	L	L	VL	VL	VL	VL	VL	VL	VL	VL	VL	★★★★
Spinosad (Success ² ™, Entrust™)	VL	L	M	VL	M	M	M	M	M	M	M	M	M	★★★★
Buprofezin (Applaud®)	L	L	VL	L	M	M	M	M	M	M	M	M	M	★★★★
Pyriproxifen (Admiral®)	L	L	L	L	M	M	M	M	M	M	M	M	M	★★★★
Imidacloprid (Confidor Guard®) soil	H	H	H	L	L	L	L	L	L	L	L	L	L	★★★★
Thiamethoxam (Actara®)	M	H	H	VH	M	M	M	M	M	M	M	M	M	★★★
Methomyl (Various registered products)	H	H	H	VH	H	H	H	H	H	H	H	H	H	★★★
Endosulfan (Various registered products)	H	H	H	M	M	M	M	M	M	M	M	M	M	★★★
Methidathion (eg. Supracide®, Methidathion, Suprathion®)	M	H	H	H	H	H	H	H	H	H	H	H	H	★★★
Chlorpyrifos (Various registered products)	VH	H	H	H	H	H	H	H	H	H	H	H	H	★ HARDEST



LEGEND VL = Very Low M = Medium H = High VH = Very High

Toxic Effect: rating derived from reduction in the natural enemy numbers due to toxic effect after spraying

★ Rating: derived from an average toxic effect on all the natural enemies by the product group after spraying

IMPORTANT NOTICE: Although SARDI, HAL and DAFF have taken all reasonable care in preparing this advice, neither these agencies nor their officers accept any liability resulting from the interpretation or use of the information set out in this document. Information contained in this document is subject to change without notice. Note that toxic effects vary between species within a natural enemy group, and hence the ratings in this table are only to be used as an indicator of the impact on any given species. This project was facilitated by HAL in partnership with Citrus Australia Limited and SARDI, and was funded by the citrus industry levy and the South Australian Government. The Australian Government provides matched funding for all HAL's R & D activities.

Acknowledgements: This document was modified from B. Walsh "Impact of insecticides on natural enemies of Brassica vegetables" and presents data from Baker and Crisp (unpublished Data), Koppers side-effects database, M.A. Mossler "Toxicity of Tomato and Bell Pepper Insecticides/Miticides to beneficial Insects" University of Florida, IFAS Extension and G. Sterk et al. "Sensitivity of non-target arthropods and beneficial fungi species to chemical and biological plant protection products: Results of laboratory and semi-field trials", 1st International Symposium on Biological Control of Arthropods. This information is research and not a product endorsement or dis-endorsement. Specific toxicity may vary between regions.



New website for the rural community

Farms and Acres is Australia's new rural community website and is being promoted as "The one stop internet market and meeting place" for farmers of all classifications.

Public use of the internet has grown dramatically in recent years and now reaches even the most remote areas of the country through Australia's Wireless Broadband Guarantee scheme. Additionally, there is a plan for all high school students to be provided with a laptop computer for school and personal use. This means that where a farmer currently has little or no knowledge of computers and the internet, secondary school student children will introduce parents and grandparents to the many advantages of the internet for the first time.

Farms and Acres plan is for the website to specifically fill a niche in the internet market place where rural business traders such as fruit, vegetable and grain growers, stud breeders, general farmers, home industries, farm service providers, rural machinery and equipment manufacturers, dealers, stock & station agents and individuals can have a permanent presence in one place that serves as an 'Australian rural community web browser' without the hassle of sorting through the main stream, and countless 'search results' in order to find the rural products, services and information required.

Apart from directly serving existing farmers, another prime potential user for Farm and Acres is the family who has moved or is planning to move onto acreage for the first time for lifestyle or to become a primary producer. The website will hopefully develop into a registry of regional products, producers and services available for permanent and quick searching for these people whenever needed. It is more than a telephone book listing because it will provide the added benefit of 'do-it-yourself' descriptive text and photographs by the user, also provision for website links and email contact details if desired. It will particularly serve the small business operator who does not have an interest in or a need for their own website. Primary producers will be able to sell their produce directly to the market and avoid the 'middle man' where possible.

Another objective is to provide town, regional and national rural community bodies such as fruit grower associations with free public access and internet base to encourage new members as well as keeping existing



members informed of proposed meeting dates and activities, executive contact details etc. This information is publically searchable using the website's massive database.

The website concept was well received by government agricultural departments, exhibitors and farmers of all classifications who made enquiries at the stand when it was exhibited publically for the first time at the Farming Small Areas 2009 Expo at Richmond in November. Being a low budget community service, the biggest challenge for Farms and Acres administration is to spread the word and to make Australia's farmers aware of the new service.

For more information contact Kerry Smith, Director, Farms and Acres, PO Box 318 Ourimbah or email: kerry@farmsandacres.com.au, www.farmsandacres.com.au



Citrus Australia National Conference – presentations now available

The Citrus Australia National Conference 2009 was held in Mildura, Victoria at the Setts from 8–11 November. The conference attracted nearly 300 growers and industry delegates. The focus of the conference was on the commercialisation of new varieties, biosecurity and grower profitability.

Keynote speaker at the conference, Dr Etienne Rabe, Vice President of Paramount Citrus, the largest grower and packer of citrus in California, says the days of free new varieties are numbered. "Australia – as one of the highest cost countries – needs to focus on the newest technology and varieties to gain advantage."

Presentations from the conference are now available to download from the Citrus Australia website at www.australiancitrusgrowers.com.au

Auscitrus update



Extracted from the Winter 2009 edition of the Auscitrus newsletter

New website

Regular visitors to our website may have noticed the long awaited upgrade has finally taken place!

Several changes were made to the behind the scenes structure of the web page to make it more reliable and easier to update, however the most notable change is to the online ordering system.

If you wish to order online you will now be presented with an online form, identical in appearance to the paper forms. You can enter your order information into these forms, and quickly and easily email them to Auscitrus. The address is still www.auscitrus.com.au

Budwood sales 2008/09

A total 473,706 buds were sold for 2008/09, down significantly on average past sales. This is well below the 10 year rolling average for bud sales, but similar to the past two years. Uncertainty surrounding water availability would appear to continue to be holding growers back from placing orders, along with a number of other uncertainties surrounding new varieties and possible future markets.

Sales into NSW and Qld continue to dominate overall sales, however sales to other states are far from insignificant.

The mix of varieties in the top ten is almost identical to the previous few years, with traditional varieties continuing in demand over other newer varieties.

Variety	Total
Mandarin Imperial	72,305
Navel Washington	52,884
Lime Tahiti	45,340
Common Salustiana	23,050
Lemon Eureka (Taylor 3402)	23,015
Mandarin Emperor	22,682
Valencia Benyenda	22,450
Mandarin W. Murcott Afourer	16,630
Valencia Keenan	14,235
Common Pineapple	13,565

Top ten varieties sold 2008/09

Seed orders 2009

Seed orders for 2009 are currently at 733 kgs. As usual *C. trifoliata*, Troyer, and Carrizo are the predominant varieties ordered. This is back up around the 10 year rolling average for seed sales, a promising sign for the industry.

Yields are down on Benton this season, resulting in a slight shortfall. Orders continue to be strong for Flying Dragon, surpassing supply.

Nursery certification

A workshop was held in April 09 to further progress the introduction of a citrus nursery certification system in Australia.

The manager of the South African citrus improvement scheme Thys DuToit was invited out to explain how they have implemented their system, as they have a successfully operating certification system with close to 100% uptake by nurseries.

Also invited was John McDonald from the Nursery and Garden Industry Association's NIASA accreditation scheme, and a selection of citrus nursery operators from the major growing regions.

In conjunction with the Auscitrus Executive Committee and staff the strengths and weaknesses of several options were debated, before finally settling on a system that should be workable for all parties. A working group was established to sort through the details, and it is expected that a draft certification manual will be ready before the Spring 2009 budwood season.

The scheme will include options for

- Certification —to prove the source of the seed and budwood used in tree production that comes from an approved source (i.e. Auscitrus).
- Accreditation —to both prove the source of the propagation material and ensure the quality of the tree. This will be based on the NIASA accreditation scheme run by the Nursery And Garden Industry Association.

The aim is to provide the end user (growers and retailers) with a citrus tree that can be assured, as best as possible, as being propagated using clean tested material from the Auscitrus scheme. This will assist the industry in controlling the spread of serious diseases, including exotic disease from overseas should they ever reach our shores.

Combating the fruit fly threat for Australian fruit and vegetable growers using biological control

Olivia Kvedaras, I&I NSW, Geoff Gurr, Charles Sturt University, Andrew Jessup, I&I NSW, Jennifer Spinner, CRC National Plant Biosecurity.

Fruit flies are considered the world's worst pests of edible fruit. Australia's \$6.9 billion a year horticultural industry is threatened by the Queensland fruit fly 'Qfly', *Bactrocera tryoni* (Froggatt). In addition to Qfly's direct damage to horticultural crops, its presence leads to significant restrictions on the access of Australian fruit and vegetables to domestic and international markets. In Australia from 2002–2006, the total average export value of our top 25 commodities that are host to fruit fly was \$432 million. Interstate trade of all host commodities subject to fruit fly quarantine is worth \$1 billion. Our horticultural industries are also threatened by the ongoing risk of invasion by related species from neighbouring countries. When the papaya fruit fly, *Bactrocera papayae* (Drew & Hancock) broke out in 1995, it devastated crops around Cairns and cost \$33.5 million to eradicate.

Growers and consumers alike are increasingly aware of the hazards associated with heavy reliance on pesticides to control such pests. In the case of Qfly, two of the main chemicals currently used, dimethoate and fenthion have recently undergone a review, placing their future availability in doubt. More than ever before, Australia needs effective, non-chemical methods for the management of Qfly and invading exotic species. Not only would this enhance the safety and sustainability of fruit fly control, it could allow an expansion of organic fruit production.

When released in large numbers as part of an integrated pest management (IPM) program, parasitoid wasps have given improved management of fruit flies in several regions of the world, including Hawaii and Guatemala. Despite this, and the importance of fruit flies as pests, inundative releases of parasitoids are not yet used in Australia.

A recent international study tour to central (Guatemala) and north America (Mexico, Florida & Hawaii) by Dr Olivia Reynolds, Professor Geoff Gurr and PhD student Mrs Jennifer Spinner aimed to gain an understanding of the intricacies and problems encountered with the mass-

rearing and inundative release of parasitoid wasps for the control of fruit fly. In each country visited, the team was exposed to first-hand in-sights into the mass rearing of parasitoids, which has allowed them to bring back a swathe of ideas to assist in and optimise the development of a future mass-rearing facility in Australia. A number of parasitoid species used in the America's include Australian species; hence the methods have direct value to Australian work. A particular highlight was visiting the Planta Moscafruit, Tapachula, Mexico, which mass-rears over 50 million parasitoids/week. One reason for the popularity of these parasitic wasps in overseas fruit fly control is that once released, they are self-dispersing, so give wide coverage including areas where other techniques, such as spraying, cannot readily be applied. That advantage extends to populated areas where fruit flies can breed on backyard fruits and vegetables but where spraying is often unpopular.

So what did we learn while on this tour? In order to avoid the difficulty of separating out unparasitised fruit flies from wasps, the eggs and/or the larvae of the host fruit fly are irradiated to render them sterile. The parasitoids can still oviposit (lay their eggs) in these sterile immatures, but any host fruit flies that emerge are rendered sterile and if released with the wasps will not be able to produce offspring. The rearing environment including temperature, hygiene and exposure time are all considered important in order to rear out a high quality parasitoid as is the quality of the host. In order to reduce costs, the spent fruit fly diet, which is high in protein, can be used as cattle feed or alternate fuel (can be burned to provide heat for boilers).

So what are the prospects for mass-rearing and releasing parasitoids in Australia? The parasitoid species mass reared overseas include Australian species and close relatives so many of the rearing protocols are already established. Located in New South Wales is the Tri-State Fruit Fly Factory, which mass-rears Qfly and often has a surplus of eggs that could be used to present to wasps for them to lay their eggs. Studies have also shown that Qfly host material can be used to rear wasps, even when irradiated. We also know that Australia would stand to benefit from better fruit fly control. Parasitoid wasps do not damage the fruit, are environmentally safe and

target-specific and would be a welcome addition to our toolbox in the battle against fruit fly in Australia.

The mass-rearing of over 50 million parasitoids/week at the Planta Moscafruit, Tapachula, Mexico. Fruit fly larvae are placed en masse in a canister (Figure 1), which is then inserted into a cage (Figure 2) where the fruit fly larvae are exposed to the parasitoids (Figure 3).



Figure 1. Fruit fly larvae are placed en masse in a canister.




Figure 2. The canister is inserted into a cage.





Figure 3. The fruit fly larvae are exposed to the parasitoids.

Key Pest and Disease Management Information for Avocados

Sandra Hardy, I & I NSW, Gosford.

Pest/Disease	Timing	Best management practices	Control strategies	Precautions & other information
<p>Anthracnose – fungus</p> 	<p>Fruit set to harvest</p>	<ul style="list-style-type: none"> • Improve tree & orchard ventilation through canopy management. • Remove sources of disease spores – dead leaves, fruit & branches. • Handle fruit carefully after harvest – keep fruit in shade; remove field heat quickly; store at correct temperature. 4-5°C for Hass & 6-8°C for other varieties. • Certain rootstocks (e.g. those of the West Indian race such as ‘Velvick’) give greater resistance of fruit to anthracnose. This research continues through the Rootstock Improvement project. 	<p>Apply protectant copper fungicides every 14-28 days depending on weather conditions.</p> <p>Use the systemic fungicide Amistar® up to 3 times per season.</p> <p>Suggested spray program: 1st & 2nd – copper; 3rd – Amistar®; 4th- 7th – copper; 3-5 weeks & 1 week before harvest – Amistar®.</p> <p>Post harvest: treat fruit with prochloraz (Sportak® or Pro-tak 450EC®) according to label directions.</p>	<ul style="list-style-type: none"> • Copper is toxic to flowers – apply after flowering. • Do not apply copper for 10 days after a phosphonate spray. • To avoid resistance developing – do not apply more than 3 sprays of Amistar® per season or more than 2 sprays consecutively.

Pest/Disease	Timing	Best management practices	Control strategies	Precautions & other information
<p>Phytophthora root rot</p> <ul style="list-style-type: none"> Prefers wet soil & warm soil temperatures – optimum range 19-25°C. 	All year	<ul style="list-style-type: none"> Purchase disease free nursery trees from a certified ANVAS nursery and choose a rootstock known to be more resistant to Phytophthora Good drainage is essential Planting trees on mounds is recommended Monitor irrigation to maintain even soil moisture. Use organic matter to improve soil conditions and keep trees mulched Maintain soil pH between 5-5.5 (except where soil manganese is high in which case aim for a soil pH of 6.5). For good root growth ensure adequate levels of phosphorous, calcium & boron through annual leaf testing Monitor phosphonate levels in roots 	<p>The application of phosphorous acid annually is used to help protect tree roots from phytophthora infection.</p> <p>Phosphorous acid when injected will move to the most actively/strongly growing plant organ – so in order to get it to move into the tree roots correct timing of treatment is critical.</p> <p>Prior to planting: dig Ridomil granules into the soil. Drench nursery trees with potassium phosphonate (5mL/litre of 20% product).</p> <p>Young trees: apply foliar sprays after the spring & summer flush has hardened.</p> <p>Mature trees: Inject trees with a 20% solution of phosphorous acid after the summer flush has hardened (May is the best time for the Central Coast, NSW). The amount of spray injected = 15mls of a 20% solution per meter of canopy diameter. A 20% solution = For a 40% product – mix 1 part of product with 1 part of water. For a 60% product – mix 1 part of product with 2 parts water.</p>	<p>The pH of the spray mix should be buffered to 7.2.</p> <p>Foliar:</p> <ul style="list-style-type: none"> For foliar applications do not apply 6 weeks prior to or during flowering or within 10 days of a copper spray. <p>Injection:</p> <ul style="list-style-type: none"> Irrigate the trees the day before injection to help with uptake. Do not prune prior to injection as the new growth may suffer leaf burn. Inject trees early in the morning. You need to get good coverage around the whole tree so space injection sites evenly around trunk/branches. Only 20mls of spray (shot volume) should be injected at each site. For mature trees injection normally results in better phosphonate levels in the roots compared with foliar applications.

Pest/Disease	Timing	Best management practices	Control strategies	Precautions & other information
<p>Fruit Spotting bug</p> <ul style="list-style-type: none"> • Most active in the upper, sun-exposed parts of the tree canopy. • Wide host range – prefers understory of native forests & love citrus blossom. • More active at temperatures > 20°C, very active and fly longer distances >32°C. • Nymphs take 5-6 weeks to develop into adults. • Nymphs can't fly so damage is likely to be in a more concentrated area. 	<p>Flowering to harvest~ most prevalent in hottest months – December to February.</p> 	<ul style="list-style-type: none"> • Monitor all trees for bugs & damage starting at flowering, through to harvest, e.g. monitor 1 side of every tree in every 2nd row in week 1 and then in week 2 monitor trees in alternate row. Repeat for whole season. • Monitor early-mid morning or late afternoons • Especially check tops of trees & exposed parts of canopy – sunny sites. • Look for damage & white exudate on fruit. Woody type damage is older (2-3 weeks at least); a white halo around the sting is more recent (1 week). • Tag trees that have damage to identify orchard hot spots & movement patterns of bugs into orchard. • Hotspots are normally downwind from alternative hosts and bugs can be carried on hot dry N/NW winds. 	<p>Your decision to spray should be based on the number of trees with live bugs and freshly stung fruit. For spraying thresholds - see "<i>Improving the management of spotting bugs in avocados</i>" by Henry Drew.</p> <p>Spot spray hot spots rather than whole orchard.</p> <p>Good spray coverage of fruit essential – calibrate your sprayer and check nozzles & spray coverage.</p> <p>Registered products include:</p> <ul style="list-style-type: none"> • endosulfan • trichlorfon (Dipterex®) • beta-cyfluthrin (Bulldock®) 	<ul style="list-style-type: none"> • Endosulfan is a restricted chemical product and can only be purchased and applied by someone who has completed an accredited chemical training course (ChemCert or SMARTtrain) and holds a current certificate/card. • A record must be kept of every application of endosulfan in accordance with record keeping requirements. • Bulldock® - Only apply a maximum of 4 sprays per season, with a minimum of 21 days between consecutive sprays.

Soil solution monitoring in Australia



This is the Technical Summary extracted from the final report.

Steven Falivene, November 2008

Analysing the soil solution using ceramic samplers has been in use since the early 1900's (Briggs and McCall, 1904). Narrow ceramic cylinder samplers were used in Australia since the late 1970's (Talsma et al 1979) and the use of plastic bodied soil solution extraction tubes (SSET) commenced in the early 1990's (Poss et al., 1995). Although the manufacture and use of soil solution extraction devices for salinity and nutrient management is not a new concept, its use in irrigated cropping has recently increased through the work of consultants and various research and extension projects. Numerous issues are faced by irrigators which include high soil salinity, maximising marketable production, reducing fertiliser costs and reducing environmental impact. Soil solution analysis is a tool that can assist in the managing these issues.

The extraction of water from the soil can be undertaken using two types of devices – active lysimeters and passive lysimeters. Active lysimeters, such as ceramic suction cups, draw water out of the soil through negative air pressure (suction) exerted within the ceramic cup. There are several manufacturers of ceramic cup samplers.

Passive lysimeters collect water by redirecting the downward flow of water during irrigation into a collection cup. Passive lysimeters can only collect a sample when a wetting front moves past the device.

The Fullstop Wetting Front Detector is an example of a



Fullstop wetting detector

passive lysimeter. When a sample is collected it triggers a signal. The signal can also be used to assist in irrigation management. There are some differences in the use and interpretation of results provided by active and a passive lysimeters. Both methods are viable options for sprinkler and drip irrigation systems.

Soil solution analysis is best used in conjunction with



Mottes 20 mm soil solution extraction tube (SSET)

other monitoring tools (eg. leaf analysis, soil analysis, visual crop assessment). Adoption of soil solution analysis depends on the necessity. The greatest level of adoption has been from growers facing production losses from soil salinity issues, both annual and perennial horticultural crops. A moderate level of adoption has been by growers of intensive annual crops and a fair level of adoption by growers of perennial crops both of which use soil solution analysis as a nutrient management tool.

The case studies presented in this report demonstrate that soil solution analysis has helped many growers to identify problems before they have had a significant impact. These growers were able to modify their nutrition and/or irrigation practices within the growing season and avert possible crop decline. Soil solution analysis is also a useful environmental management tool to reduce nutrient leaching, however little government incentive or regulation is provided for grower to adopt soil solution analysis for this reason.

A significant barrier to adoption has been the lack of information and training as well as the perceived high cost of soil solution extraction devices. This report identified numerous low cost manufacturers of soil solution extraction devices. Growers need to be able to understand and interpret soil solution result data. An opportunity exists to; 1) develop an extension package on how to use and interpret soil solution analysis 2) work with agronomic consultants to assist in the adoption of soil solution analysis technology and 3) establish a group to manage and facilitate the adoption of soil solution analysis.

A full copy of this report can be found at <http://irrigationfutures.org.au/publications.asp?pbID=9075>

Maintaining an efficient irrigation system

Jeremy Giddings, Irrigation Officer, I&I NSW, Dareton.

It is important to ensure that your irrigation system is performing as close to specification, and as efficiently, as possible. It's a good time to check your system performance and carryout appropriate system maintenance.

Three aspects of irrigation system maintenance and monitoring are;

- Maintenance of emitter / sprinkler operating pressures and discharge
- Flushing of drip systems
- Cleaning of drip systems

Operating pressures and discharge

All irrigation systems have well recognised industry performance standards. Pressure variation should not exceed $\pm 10\%$ within a valve unit, and discharge $\pm 5\%$. Recent evaluation programs and workshops available to irrigators have shown that many irrigation systems are not performing to their specifications and that maintenance programs need greater attention.

Flushing of drip systems

For drip irrigators, flushing the system is something that has been generally neglected until recently. Many local irrigators have gone from flushing the system just once per year (if at all) to monthly in some situations. Managers should ensure that their system is able to be adequately flushed. To do this water velocity must be greater than 0.5m/s. Simple rules of thumb are available to determine if adequate flushing velocity exists.

Cleaning of drip systems

Likewise the frequency of chlorine or hydrogen peroxide injection has also increased. Both products are used to kill organic matter in the system, including algae, mussels and protozoa. Injection of these chemicals does not remove the organic matter. Further flushing is required to remove this material. OH & S issues need to be followed.

Some confusion still exists regarding what to inject into drip systems. You must inject the right chemical for

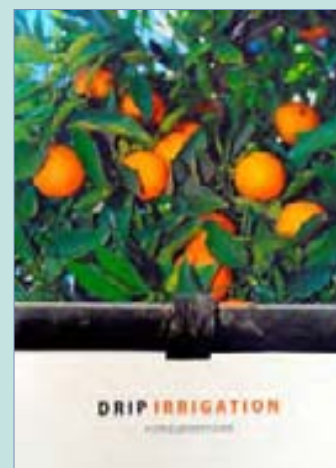
the right job. Chlorine or hydrogen peroxide is used to kill organic matter. Acid injection is usually to dissolve chemical deposits, which are rarely a problem unless an error in fertiliser mixing has occurred. Acid injection may also be used in an attempt to burn off roots which have penetrated emitters. Clay and silt deposits in drip systems are a result of inadequate system flushing. Chlorine injection may be needed in this situation if algae is encouraging clay buildup in pipes and emitters.

To obtain further detail, drip irrigators should consider attending a half day drip workshop. Following attendance at a recent workshop an irrigator flushed a drip system for the first time in 15 years and dropped the discharge variation from $\pm 30\%$ to $\pm 15\%$. Chlorine injection and further flushing dropped this to $\pm 9\%$. This is still above the recommended $\pm 5\%$ but a lot better than the previous level of performance.

Drip Irrigation – a citrus grower's guide

This 120 page booklet includes information on water quality, designing drip systems, irrigation scheduling, fertigation, system monitoring and maintenance, soil management, the economics of drip and grower case studies.

Available from the I&I NSW bookstore phone 1800 028 374. Cost \$22 and \$8 p&h.



Managing blue-green algae in farm dams

Bill Yiasoumi, Irrigation Officer, Richmond, John Gillett, Former Irrigation Officer & Dr Chris Bourke, Former Principal Research Scientist

(Extracted from Primefact 414, May 2009. The complete Primefact can be downloaded from www.dpi.nsw.gov.au)

Farm dams are vulnerable to blue-green algal blooms, as are the coastal and inland dams and rivers of NSW. A blue-green algal bloom is a rapid increase in the number of blue-green algae, and usually, but not always, occurs in summer months.

How do I know if my dam contains blue-green algae?

- A blue-green algal bloom discolours the water, so that the surface looks like green acrylic paint.
- An unpleasant odour may be noticed.
- As the algae concentrate and mature, some forms of surface scums which are vulnerable to wind effects may appear at different places on the dam at different times. The blue-green algae may disappear and reappear on subsequent days, or accumulate on the downwind edges of the dam.

If you suspect that you have blue-green algae in your dam you should immediately remove all animals from the paddock or fence off the dam to exclude stock.

How does blue-green algae affect livestock?

Animals have died after drinking water that is contaminated with blue-green algae. You need to prevent animals from drinking contaminated water and provide alternative supplies.

Blue-green algae can release either neurotoxins which can kill animals within hours of ingestion or liver toxins that can kill animals within 24–72 hours of ingestion.

Affected animals will have:

- breathing difficulties
- muscle twitches
- salivation
- weakness

- a rapid pulse
- depressed and weak
- photosensitisation – any white areas of skin, particularly around the head, may become swollen and reddish.

All animal species are at risk of poisoning, as are insects such as honey bees. Domestic pets such as dogs may die when they try to lick algal scum off their coat. Algal blooms can kill fish indirectly by reducing the level of oxygen in the water.

Sun-dried algal scum can remain toxic to animals for up to five months.

Can I use water containing blue-green algae for irrigation?

Take care if you need to use water contaminated by blue-green algae for irrigation. Because many toxins are very slow to break down, human and animal health may be threatened if contaminated water is applied directly to crops and pastures.

Do not directly use water that has blue-green algae present on plants being grown for human consumption, particularly for spray-irrigated salad and leafy vegetables, because dried algal cells on the leaves can remain toxic for several months. In addition, algal blooms can clog syphons, filters, valves and sprinklers.

If you have to use blue-green algae contaminated water for irrigation, thoroughly wash and rinse fruit and vegetables with clean, uncontaminated water before eating.

Should I use an algicide?

If you must use an algicide, exclude all animals for at least three weeks after its use, because the water can remain toxic for that period.

Previously, copper sulfate was recommended as a treatment for algae, but this is no longer a recommended product. Prevention of algal blooms is preferred to chemical control.

Use of Simazine under permit

The APVMA has issued a permit for the use of Simazine to control blue-green algae in farm dams. You must obtain, read and comply fully with the permit if you wish to use this product. The permit can be found at the following address: <http://permits.apvma.gov.au/PER10994.PDF>

Currently in NSW, only Coptrol Aquatic Algicide, Cupricide Algicide and Cupricide 110 Algicide are approved for the control of blue-green algae, green algae, diatoms and flagellate algae. They must be used in strict accordance with their label conditions and directions. Both products contain copper as mixed complexes and are registered for use in farm dams, rice paddies and irrigation conveyance systems. They must not be used in rivers, streams, creeks, wetlands, lakes or billabongs, and water treated with these products must not be allowed to spill into these water bodies.

The conditions of use for these chemicals further prevent their application when birds are feeding on algae or in water containing fish. As with all chemicals, read the instructions before use, wear the appropriate safety equipment, and always adhere to withholding periods on labels or permits.

Do not use copper based products to treat drinking water used by farm animals that have a history of grazing Paterson's curse, heliotrope or ragwort. Increased intake of copper through treated drinking water may lead to copper poisoning and death.

What triggers blue-green algae growth?

Excessive phosphorus

An excessive level of the nutrient phosphorus promotes the rapid growth and multiplication of blue-green algae. The main sources of phosphorus in farm dams are phosphorus attached to eroded soil particles and phosphorus from stock manure washed into dams.

Water quality in the farm dam will be affected by muddiness and silting as a result of soil erosion within the catchment or fouling by stock and other animals. There is evidence that carp can root out water plants and will stir bottom and bank sediments during feeding, increasing the muddiness of the water. This destruction of plants and release of nutrients can promote blue-green algae.

Warm water

Warm water temperatures encourage blue-green algae to flourish under calm summer conditions and to grow rapidly when water temperatures exceed 18°C. Solar heating results in warm lighter surface water over the colder lower water. This causes two distinct layers to form (this is called thermal stratification). The algae flourish in the warm surface water, and the reduced oxygen levels at the bottom assist the release of phosphates from sediments into the water; these feed the algae.

More rarely, toxic blue-green algae have occurred in NSW during winter in high nutrient content waters.

How can I prevent blue-green algae blooms?

Manage nutrient input

Improved management of nutrients is the key long-term strategy for the control of blue-green algae in farm dams. If the nutrient levels of the water remain high, blue-green algae will continue to be a problem in spite of the use of other control methods.

Nutrients, particularly phosphorus, which is present in fertilisers and manure, should be carefully managed in the dam catchment area.

- If possible, fence out stock and divert stockyard and sheep camp run-off away from the dam. Establish gravity-fed troughs for drinking water.
- Use irrigation scheduling techniques to eliminate run-off from irrigated agricultural land. If there is any surplus water, it should be recycled.
- Buffer strips of vegetation (perennial grasses and trees) can be placed in the in-flow areas of the dam to help stop nutrients and eroded soil from entering farm dams. Long grass, shrubs and trees are needed to slow water flows, intercept nutrients and prevent erosion. This area should be fenced from stock.
- It is very important to control soil erosion to stop soil particles moving into farm dams. Soil particles have phosphorus stuck to them, particularly after phosphate fertiliser has been applied.
- Avoid excessive use of fertilisers.
- Domestic use of washing powders and detergents containing phosphate and septic effluent are other potential sources of phosphorus which may need to be controlled.

Remove carp

Carp should be removed by netting or other means.

Mix water layers

The mixing of the warm and cold water layers is recommended for deep water dams. Artificial aeration can be beneficial in shallow dams to maintain healthy bottom sediments and high oxygen levels in still water conditions. A small compressor with an attached perforated hose in the deepest area of the dam can remove the hot water layers.

Remove phosphorus by dosing

Dosing is only appropriate for farm dams.

Do not apply the treatment to streams or billabongs or other natural waterways.

Farm dams can be protected from blue-green algae by dosing with alum and gypsum. These chemicals work by removing phosphorus (the most important nutrient for blue-green algae) from the water.

Ideally, dosing should be carried out before summer, and certainly before a bloom has developed.

The recommended dose is 50 kilograms of alum and 50 kilograms of gypsum for each megalitre of water. Because of variations in water quality and algae, it is advisable to conduct a preliminary trial in a 44-gallon drum to establish the correct dosage.

Dosing procedure (farm dams only)

Add the granules of alum crystals to the water and mix well. You could perhaps use a boat with an outboard motor to mix in the crystals.

Let the water stand for a few hours, and add the gypsum granules.

Let the water stand for at least 24 hours, or until it clears. If it does not clear within two days, add 25 to 50 per cent of the recommended dosage of alum and gypsum to promote settling.

After dosing, check the pH of the water with a swimming pool testing kit. The pH should be in the range 6–9. If it is not, allow the water to stand two days and check again.

HAL announces new CEO

Auscitrus, Thursday, 24 September 2009

Horticulture Australia Limited (HAL) has announced the appointment of Mr John Lloyd as its new chief executive officer.

Mr Lloyd has, up until recently, run a management consultancy specialising in operational and strategic advice to agricultural clients. He has previously been the CEO/vice president of CNH Australia/NZL, general manager commercial at Incitec Pivot, and general manager marketing at Wesfarmers Dalgety.

John has extensive experience in agriculture with practical farmers as well as experience in business management in agriculture and marketing.

Mr Lloyd is looking forward to starting in the role. "I'm really excited about taking up the position with HAL and working in an industry that shows such exciting growth prospects over the next five to 10 years."

Mr Lloyd's appointment comes just as HAL is about to embark on a strategic planning process to set the direction for the company to 2015.

"The strategic planning work gives me the opportunity to get involved with all the stakeholders in the industry and work to coordinate common objectives," Mr Lloyd said.

Mr Lloyd will take up the position on 2 November from Ms Vanessa Goss who has been acting CEO since April.

"The Board wishes to both thank and congratulate Vanessa for the skill and dedication she has displayed while acting in the role," Dr Steele Scott said.

Horticulture Australia Limited (HAL) is a not-for-profit, industry-owned company. It works in partnership with Australia's horticulture industries to invest almost \$90 million annually in research, development and marketing programs that provide benefit to industry and the wider community.

Preliminary results of new management systems and effects on early fruit production and quality in low-chill stonefruit

R J Nissen, A P George, S Price & D Bruun, Queensland Primary Industries & Fisheries, Maroochy Research Station.

Extracted from the Low Chill Stonefruit Grower Newsletter, November 2009

Background

Costs of growing low-chill stone fruit have increased dramatically in the last five years from an average variable cost of about \$7.20 to more than \$10.00 per tray. Many growers are finding it increasingly difficult to produce and market fruit that fully meet the needs of their target market consumers whilst trying to cover increasing production costs. Traditional management systems have fallen short in maximising the quality of the total crop produced. Management systems proposed here aim to maximise the fruit quality aspects such as sugar concentration, size and eating quality of the total yield by:-

- utilising new varieties
- taking full advantage of available light through new pruning and training systems
- controlling vegetative growth
- protecting the crop via netting
- mulching to improve nutrient uptake, water use efficiency

New varieties

The effectiveness and economic performance of the new training and management systems will be highly



Figure 2. Old palmette trees recently summer pruned – sub-leaders trained to the oblique

dependant on the use of new varieties and selections being released by the DPI&F stonefruit breeding program being led by Dr Bruce Topp. Many of these new varieties are in the process of being field-tested under the new high performance training and management systems developed at the Maroochy Research Station.

Training systems

Palmette

Over many years both our Centre and farmers have trialled various training systems for low-chill stonefruit including vase, palmette, pillar, and open Tatura. The mostly commonly used training system with low-chill stonefruit is the palmette with sub-leader obliquely



Figure 1. Traditional system – palmette with sub-leaders trained to the oblique



Figure 3. Espaliered palmette. Note the three sub-leaders on each side of the central leader

trained to a 45° angle (Figures 1 and 2).

We no longer recommend the oblique palmette system because it encourages vigorous vertical growth.

More recently, we have trialled stonefruit on a palmette training system with the sub-leaders espaliered. The sub-leaders are laid horizontally along the wires of a vertical trellis (Figure 3).

Open Tatura

This system was developed at the Tatura Research Station in Victoria for growing high-chill temperate fruits such as peach and apple.

Rows are spaced 4.5 to 5 m wide from centre to centre, and each pole is set at a 22.5° angle to the vertical (Figure 4); the angle of the V is 45°. In some systems the angle is increased up to 60°. Poles are about 3 m long with approximately 2.3 m protruding from the ground.

The maximum height of the canopy in summer is 2.7 m (60% of row width measured vertically). The trees are planted about 3 m apart in a

diamond shape, alternating left and right.

Espaliered v trellis system

Our early studies have found that a modified version of the Open Tatura trellis systems (Figure 5) appears to giving the best performance in terms of fruit quality, yield and ease of management. A brief description of this system is presented below:

V Trellis System

- Tree spacing, 4.5 – 5.0 metres between rows and 2.5 – 3 metres between trees within rows = about 1,500 – 1,700 trees per hectare
- Sub-leaders are espaliered not trained to the oblique (Figure 3)
- Tree height restricted to less than 3.0 m to avoid picking from ladders
- 4 sub-leaders are trained on either side of the central leader each with 15–20 fruiting laterals
- For the first 2 years after planting, tree growth is promoted to fill the allotted canopy area as quickly as possible

- Trees commence yielding in year 2 and reach maximum yield at year 4
- Excessive growth is controlled with soil-applied paclobutrazol with applications commencing in either year 2 or 3
- Further growth control is obtained by both pre- and post-harvest spring and summer pruning
- Expected marketable yield of 20–35 kg per tree, = 28–32 tonnes/hectare (about 7,000 trays/hectare)
- Labour costs for pruning, thinning and harvesting reduced by 30% if growth retardants are used – cost per tray of about \$8.50 per tray
- Using a farm gate price of \$18 per tray, net returns of about \$50,000 per hectare are feasible.

This trial was conducted on the Queensland DEEDI, Primary Industries and Fisheries, Maroochy Research Station, Sunshine Coast Region of South East Queensland (26.370S, 152.570E, 29 m elevation) on 2 year old trees of the variety 53-4 (one selection of Bruce Topp's new breeding lines).

Plants growing under two netting types, Bird and Bat Netting (Black Bird and Bat hexagonal net with a diameter of approximately 15 mm) and Fruit Fly Netting (Translucent Monofilament Fibre Exclusion Netting with light-weave 2mm). Two mulch treatments were applied to the trial trees and these were:

- Barley straw mulch (laid to a depth of 15 cm)
- Reflective mulch (Tye Veck Mulch & White Weed Mat)

Trees are planted alternatively on the inside of the trellis in rows running

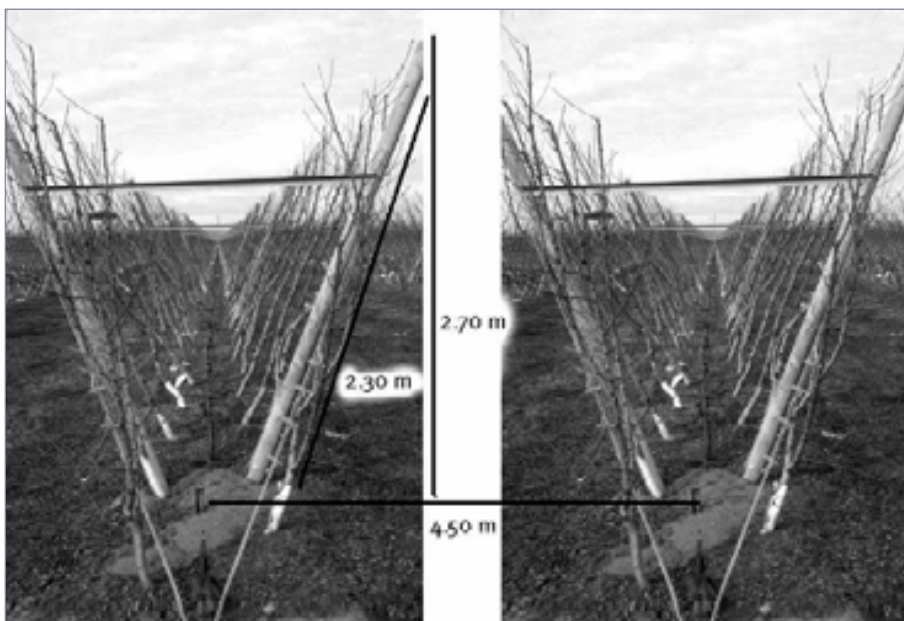


Figure 4. Dimensions and spacing for the open V-trellis system (Bas van den Ende, 2001)

north south, two treatment trees slope out, towards the east and two treatment trees slope towards the west. Trees are trained to the V Trellis Systems described above and espaliered. Trees have eight branches set along 4 wires spaced 500mm apart and laterals are spaced approximately 10 cm apart along the branch. Spring and summer pruning is conducted to eliminate vigorous growth which effects fruit quality.

Netting and mulch treatment effects on total yield and fruit size

Comparing total yield for the three treatments showed that the fruit fly netting straw plus mulch treatment had the heaviest yield with the least number of fruit and largest fruit, with an average weight of 134.07 grams (see Table 1.)

Netting and mulch treatment effects on fruit quality

Fruit fly netting plus straw mulch treatment fruit had the highest percentage of blush, approximately 6% and 19% more than the bird and bat plus reflective mulch and bird and bat plus straw mulch respectively.

Fruit from the fruit fly net plus straw mulch treatment had better flavour than the two bird and bat net



Figure 5. Maroochy V trellis system with sub-leaders espaliered

treatments of reflective and straw mulch. The fruit fly net plus straw mulch treatment was approximately 23% better than the bird and bat reflective mulch and approximately 34% better flavour than the bird and bat net plus straw mulch (Table 2).

Table 1. Netting effects on yield and fruit size for four trees, two years of age.

Treatment	Total Fruit No	Total Fruit Weight (kg)	Average Fruit Weight (g)	Average Fruit Size (mm) Check to Check vs. Styler to Stem End
Fruit Fly Net & Straw Mulch	346	46.38 (kg)	134.07 (g)	63.13 vs. 59.90
Bird & Bat Net & Straw Mulch	359	40.57 (Kg)	113.01 (g)	60.32 vs. 56.29
Bird & Bat Net & Reflective Mulch	386	41.46 (kg)	107.42 (g)	58.68 vs. 56.25

Table 2. Netting effects on fruit quality for four trees, two years of age.

Treatment	Average % Blush	Average Firmness (kg)	Average TSS ("Brix)	Average Flavour rating (Hedonic scale 1-9)	Average No. of days to ripe
Fruit Fly Net & Straw Mulch	58.3%	6.36 (kg)	11.83	5.13	4.24
Bird & Bat Net & Straw Mulch	47.7%	6.04 (kg)	11.92	3.38	5.20
Bird & Bat Net & Reflective Mulch	55.3%	4.81 (kg)	12.07	3.97	5.74

Fruit from the fruit fly net plus straw mulch were only slightly firmer than the bird and bat net plus straw mulch but 24% firmer than the fruit taken from the bird and bat plus reflective mulch.

For the fruit fly net plus straw mulch, on average, fruit ripened one day earlier compared to both the bird and bat reflective and straw mulch treatments.

TSS (°Brix) levels between all Netting and mulch treatments varied by only 2% (Table 2.)

Directional treatment effects

Directional treatment effects on total yield and fruit size

Trees facing east had approximately 20% more fruit and total yield than the trees facing west. No discernable differences were found for average fruit weight and average fruit size (Table 3).

Directional treatment effects on fruit quality

For the treatment trees facing west, fruit on average had 5% more blush, were 14% firmer, had 3% higher total soluble solids (°Brix) levels, 6% better flavour than trees facing the east (Table 4).

Branch position effects

Branch position effects on total yield and fruit size

The top espaliered branches, 4th trellis wire from the base had 15 % less fruit and total fruit yield than the espaliered branches immediately below, the 3rd trellis wire from the base. The bottom espaliered branches, 1st trellis wire had 3% less fruit than the 3rd trellis wire from the base. The bottom and espaliered branches had 13% less total yield and average fruit weight was 11% less compared to the fruit that the 3rd trellis wire. The 2nd trellis wire also had 13% less total yield but average fruit weight was 5% below fruit produced on the 3rd trellis wire. Fruit on the 1st trellis wire were approximately 3% smaller in size. (See Table 5.)

Branch position effects on fruit quality

The bottom espaliered branches, 1st trellis wire had fruit with 12% less blush than the top espaliered branches, 4th trellis wire from the base. Fruit produced on the 4th trellis wire from the base were 21% softer than fruit produced on the 2nd trellis wire. Fruit produced on the espaliered branches on 4th trellis wire had the highest total soluble

Table 3. Directional effects yield and fruit size for six trees, two years of age.

Treatment	Total Fruit No	Total Fruit Weight (kg)	Average Fruit Weight (g)	Average Fruit Size (mm) Cheek to Cheek vs. Styler to Stem End
East	606	71.03 (kg)	117.22 (g)	60.95 vs. 57.91
West	485	57.38 (Kg)	118.33 (g)	60.33 vs. 57.03

Table 4. Directional effects on fruit quality for six trees, two years of age.

Treatment	Average % Blush	Average Firmness (kg)	Average Total Soluble Solids (°Brix)	Average Flavour rating (Hedonic scale 1-9)	Average No. of days to ripe
East	52.4%	5.33 (kg)	11.77	3.76	4.99
West	55.1%	6.17 (kg)	12.16	3.99	5.13

Table 5. Lateral position effects on yield and fruit size for twelve trees, two years of age.

Treatment	Total Fruit No	Total Fruit Weight (kg)	Average Fruit Weight (g) for twelve, two year old trees	Average Fruit Size (mm) Cheek to Cheek vs. Styler to Stem End
1 st trellis wire	283	31.04 (kg)	109.69 (g)	59.34 vs. 56.10
2 nd trellis wire	268	31.24 (kg)	116.59 (g)	60.82 vs. 57.20
3 rd trellis wire	292	35.81 (kg)	122.65 (g)	61.45 vs. 58.43
4 th trellis wire	248	30.32 (kg)	122.26 (g)	61.12 vs. 58.27

Table 6. Lateral position effects on fruit quality for twelve trees, two years of age

Treatment	Average % Blush	Average Firmness (kg)	Average TSS (°Brix)	Average Flavour rating (Hedonic scale 1-9)	Average No. of days to ripe
1 st trellis wire	50.5 %	5.62 (kg)	12.09	3.83	5.19
2 nd trellis wire	54.4 %	6.27 (kg)	11.63	3.93	5.06
3 rd trellis wire	52.9 %	5.90 (kg)	11.81	3.67	5.03
4 th trellis wire	57.2 %	4.97 (kg)	12.29	4.09	4.93

solids (°Brix), 4% greater than the 3rd trellis wire, 5% greater than 2nd trellis wire and 2% greater than the 1st trellis wire. Fruit produced on the 4th trellis wire had the best flavour rating 10%, 4% and 6% greater than fruit produced on the 3rd, 2nd and 1st trellis wires respectively. (See Table 6.)

Lateral position effects

Fruit lateral position effects on total yield and fruit size

Fruit number was greatest at lateral position 1. A total of 150 fruit was recorded, with an average of 1.56 fruit per lateral at fruit lateral position 1. Fruit lateral position 1 is the fruit lateral immediately adjacent to the trunk. There was a decrease in fruit number from fruit lateral position 1 to fruit lateral position 18, the fruit lateral position at the greatest distance from the trunk. Fruit lateral position 18, had a total of 1 fruit, and an average 0.01 fruit per lateral at fruit lateral position 18 was recorded. (See Figure 6.)

Total fruit weight for each later fruit position followed the same pattern as fruit number. (See Figure 7.)

Average fruit weight decreased slightly for each fruit lateral position on the branch towards the branch tip. From the trunk fruit lateral position 1 to fruit lateral position 15, average fruit weight ranged from 112.0 to 122.13 grams. For fruit lateral position 16, 17 and 18 average fruit weights were considerable smaller, 94.5, 77.0 and 93.0 grams respectively. (See Figure 8.)

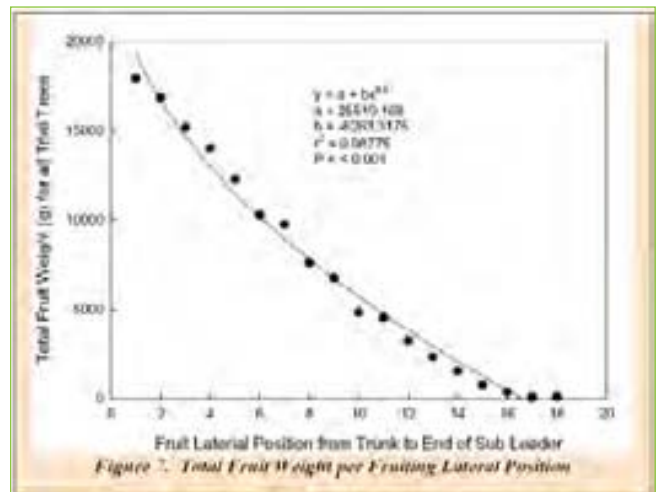


Figure 7. Total Fruit Weight per Fruiting Lateral Position

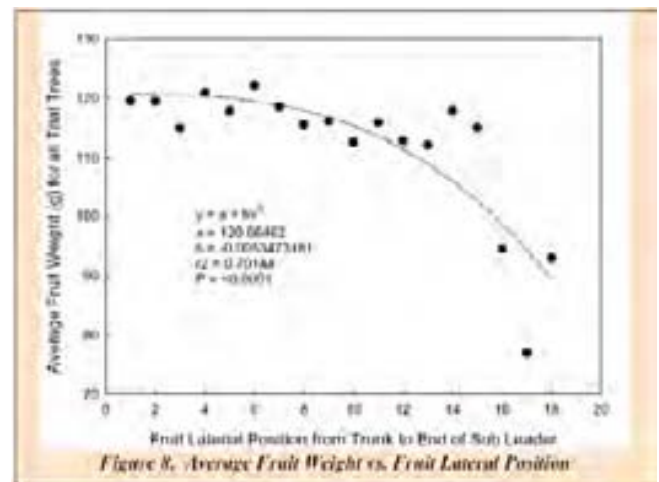


Figure 8. Average Fruit Weight vs. Fruit Lateral Position

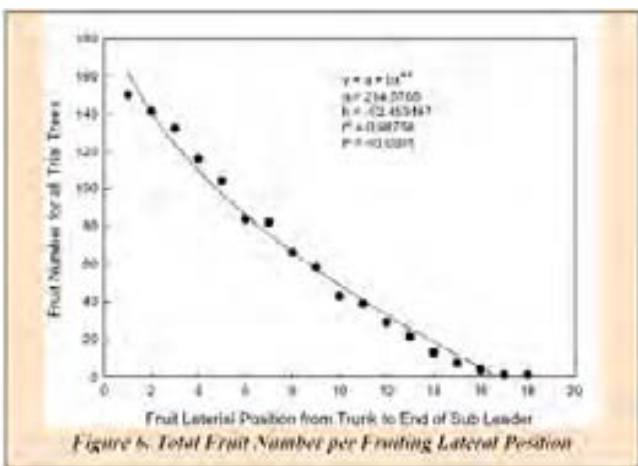


Figure 6. Total Fruit Number per Fruiting Lateral Position

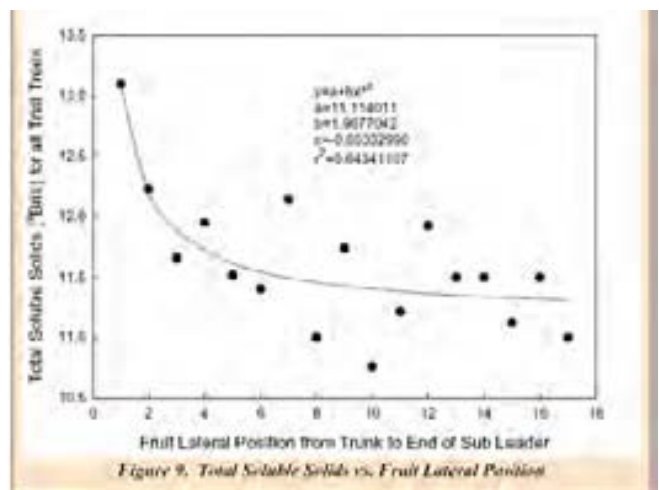


Figure 9. Total Soluble Solids vs. Fruit Lateral Position

Fruit lateral position effects on fruit quality

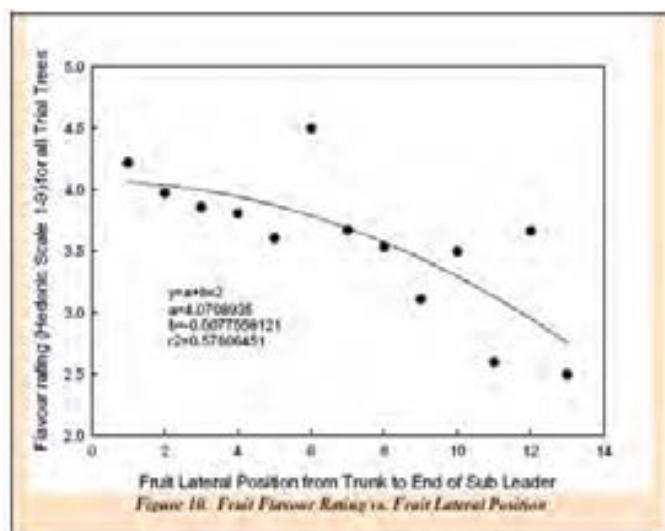


Figure 18. Fruit Flavour Rating vs. Fruit Lateral Position

Conclusions

Comparing the different types of netting, clear fruit fly netting with straw mulch versus bird and bat netting with straw and reflective mulch had 20% larger fruit, fruit that were 19% more highly coloured, 34% firmer, and 2% sweeter tasting. **Therefore, fruit fly netting plus mulching with straw significantly improved fruit quality making fruit more acceptable to the consumer.**

Comparing directional effects east versus west. **Trees facing east had 20% more fruit with no differences in average fruit weight but trees facing west had fruit with 5% more blush, were 14% firmer, 3% sweeter, and had 6% better flavour than trees facing the east.**

Whilst trees in this experiment were only young and had not fully matured, results were typical of fruiting patterns for low-chill stone fruit trees. Whilst trees had not filled their allotted space or achieved their full lateral spread on the Maroochy V Trellis System, findings showed typical fruit growth and quality patterns to that of traditionally trained palmette and vase trained low-chill stone fruit trees, **where the largest and highest quality fruit are still produced in the top one third of the tree.**

Fruit positional effects showed that fruit produced on the laterals closest to the central leader were larger, sweeter and had more flavour. Therefore when training low-chill stonefruit trees laterals should be kept to about one metre in length and tree spacing along the rows two metres apart for trees trained to this new Maroochy V Trellis System.

New strategic direction for horticulture access

Source: SA Citrus Board newsletter 2 October 2009.

The Board of Horticulture Australia (HAL) has appointed Tasmanian fruit grower Tim Reid as the inaugural independent chair of the new Office of Horticultural Market Access (OHMA) established to improve the opportunities to open new markets for Australia's \$8.6 billion horticulture industry.

HAL's Acting CEO Vanessa Goss said that Mr Reid's experience and passion in the area of market access, particularly for Tasmanian cherries into markets such as Japan and USA, and his dedication to the horticulture industry has made him an ideal choice to lead the new office.

Mr Reid will lead a skills-based committee with seven industry members from exporting industries, two members of the Australian Horticultural Exporters Association and one HAL representative.

OHMA builds on the work of the Horticultural Market Access Committee (HMAC) which was responsible for prioritising market access applications for Australian Government negotiations with international governments in target markets.

Horticulture is the third largest agricultural industry with exports of \$925 million. It has been estimated that a further \$300 million in export revenue could be generated over a period of time by achieving or improving market access through tariff and non-tariff barriers.

Draft National Fruit Fly Strategy implementation action plan released

Source: SA Citrus Board newsletter 4 December 2009.

A draft National Fruit Fly Strategy (NFFS) has been released by the Minister for Agriculture, Fisheries and Forestry, as an initiative to implement an effective national management strategy for exotic and endemic fruit fly species.

A copy of the Action Plan together with the draft NFFS can be found at www2.planthealthaustralia.com.au/fruitfly. Plant Health Australia is now seeking comments and responses on the Action Plan from all stakeholders.

For further information contact James Garden on 02 6215 7711.

Queensland flying fox research update

Extracted from the November issue of "A Flying Fox Update" by the QLD Industry and Government Flying Fox Working Group.

On farm trials

Integrated deterrent system trails have been installed at an orchard at Ballandean. The trial will incorporate a range of deterrents including laser and strobe lighting together with sound deterrents (gas guns). These non-lethal deterrents are linked to a radar system to detect incoming flying animals which activates the deterrents.

Light deterrent evaluations have commenced at a property at Sarina. QPIF staff have identified and tagged lychee panicles for damage assessment at harvest. Initial light meter readings have been taken throughout the property on a grid basis for further analysis.

A **hail cannon** component of the trials will be undertaken over a short timeframe when there is significant evidence of the presence of flying foxes.

Eagle eye – QPIF funded the establishment of 4 Eagle Eye™ units in the Childers region. These units have been moved from the longan block to a suitable lychee block for the upcoming season.

Long term flying fox research

The Department of Environment and Resource Management (DERM) are in the process of assessing the future long term research to be undertaken in the area of flying fox behaviour and management. The research questions have been designed to primarily investigate "How do flying-foxes find fruit crops?" and "How do flying-foxes use fruit crops?"

One of the underlying challenges for managing flying-foxes in fruit crops is our lack of understanding of how the animals perceive the landscape they occupy and how they locate food resources within it. A better understanding of the mechanisms used by flying-foxes to locate food would greatly assist with managing crop damage. It would help explain why some methods of non-lethal crop protection appear to be more effective than others, provide useful insights for improving the performance of existing methods and assist with creating a sound basis for developing new methods. Although a small number of studies have included attempts to understand the ranging behaviour of flying-foxes, none have been targeted to address issues pertinent to managing flying-foxes in fruit crops.



Integrated deterrent trial installations at Ballandean

A range of topics could be addressed by this work including, but not limited to, whether individual flying foxes:

- are completely reliant on fruit crops in certain seasons;
- show consistent preferences between varieties or cultivars in the wild; or
- return to the same orchard through time and the same tree/s on consecutive nights.

Draft national recovery plan for the greyheaded flying fox

This plan considers the conservation requirements of the species throughout its range, sets objectives for recovery and identifies actions to be undertaken to ensure long-term viability of the species. Interested parties are invited to comment on this draft recovery plan. **The public comment period closes 4 January 2010.**

If you wish to comment on a draft recovery plan, please send your comments, quoting the title of the plan, to:

Email: recoveryplans@environment.gov.au

Post: Director - Recovery, Planning and Implementation Section

Dept of Environment, Water, Heritage + Arts

GPO Box 787

Canberra ACT 2601

For more information and to download a copy of the paper go to: www.environment.gov.au/biodiversity/threatened/publications/recovery/pteropus-poliocephalus.html

Keeping spray equipment clean

*Keith Fallow, Yara Nipro Pty Ltd,
www.yaranipro.com.au*

Many growers are now coating their spray equipment with a protectant prior to spraying coppers and other hard to clean off products that are inclined to stick to their machines.

Here are some of the options growers are using to keep their equipment clean.

1) Coat sprayer and tractor with a protectant

- (i) Use a 5 L pump up sprayer or similar to coat the sprayer with a range of products (5 minute job).
 - a. Lanolin based protectant (see information below)
– This will often last 2 or 3 months.
 - b. Winter or summer oil: Some growers apply it neat other use it diluted up to 1:5 oil: water mixture.
 - c. Diesel, or a 50:50 diesel/used hydraulic oil mixture, (can be hard on rubbers etc).
 - d. CRC, Innox or DW 40 type lubricants or similar to completely coat their machines.
 - e. Neat wetter (BS1000 or Agral or similar) or neat detergent (truck wash etc) and let it dry on the equipment prior to spraying
- (ii) Clean the sprayer with a high pressure sprayer and a good quality truck cleaner or degreaser every 1–2 days for options (b–e).

These deposits always seem to come off easier if washed off immediately after the spraying is completed and while the deposits are still damp

Once deposits have dried and or “baked” on and formed a crust they are harder to remove.

The key to success of this technique is to re-apply any of the lanolin or oil based coatings (a–d) immediately after cleaning. This allows the oils etc to penetrate and seal the sprayer with a film of oil.

2) Apply car wax to the equipment

Some growers also wash their tractors several times per year with automobile silicon ‘wash and wax’ type products. eg ‘Armorall spray on car polish’ or ‘wash n wax’ etc.

Apply with either a sponge and a bucket or a pressure washer etc. It is sometimes beneficial to do a second coat after the first has dried.

Spray deposits clean off shiny surfaces much more easily than a surface that is pitted or rough.

3) For cleaning existing deposits

Try:

- (i) Covering sprayer with diesel overnight to soften deposits then use a good truck wash and a hot wash pressure washer.
 - (ii) Some growers have been using rust remover/rust neutraliser products such as Corro Dip (Liquid Engineering www.liquideng.com.au ph 1800 804 007).
These are usually a blend of partially neutralised organic acids with a pH of 2–3. They work by dissolving the deposits of copper salts and fungicides etc stuck to the inside and outside of the tanks. Use neat for heavy deposits or up to a 1:5 dilution with water for regular cleaning.
- Spray onto a small area, leave a couple of minutes and scrub off with either a brush or high pressure washer

Precautions

- when cleaning paint work (duco) of any description test any cleaner on a small area of the sprayer/tractor paintwork first to confirm it will not do any damage/staining/etc.
 - do not apply any of these cleaners/degreasers/detergents when temps exceed 25–30°C
- ⇒ wait until temps cool before cleaning equipment.

Using lanolin based protectants for horticultural sprayers

Lanolin is a natural product that has been used for centuries as a protectant and lubricant. Lanolin based products have penetrant, anti-corrosion and anti-seize properties. These products are proving to be very effective as protectants for agricultural machinery – the lanolin coating protects the sprayer over the season and is reasonably easy to remove at the end of the season.

Products

Currently there are several manufacturers of these products. Most produce a grease and two grades of liquid lanolin. Use the heavy duty sprayable product rather than the lighter general purpose product. Many Machinery Dealers and some Ag Retailers stock these products or contact :

Lanox ph 07 5525 2840 www.inox.net.au

Lanotec ph 07 3373 3700 www.lanotec.com.au

Woolube ph 1300 664 663 www.woolube.com.au

Lanolube ph 03 9720 3606 SST Horticultural products

How to apply

These products should be applied neat. Apply the liquid lanolin product using a hand held atomiser or small pump up sprayer to completely coat all surfaces of the sprayer with a thick coat of lanolin. Preferably apply outside and on a warm day.

Allow several hours for the lanolin to penetrate into and around all surfaces and for the solvent to evaporate. One spray can give up to 3-4 months protection if the washing techniques below are followed correctly.

Cleaning up the sprayer

The key to using Lanolin based products is to only remove the surface covering of spray deposits and dust without disturbing the lanolin film underneath

- **Daily**

Rinse off the worst of any dust and loose spray coating etc with water from a hose at the end of each day.

Take care to avoid removing the underlying sticky lanolin film. Try not to use a pressure washer as this could remove some or all of the lanolin film.

Re-apply more lanolin to any high risk areas with a few squirts from a hand held atomiser (e.g. where hosing off may have removed some of the underlying coating). It also pays to touch up susceptible spots such as hydraulic couplings and mild steel brackets and nuts or where the coating may have been rubbed off by foliage etc. (5 minute job each day).

- **1-3 times per season**

Use a hot wash pressure washer or a cold pressure washer with a degreaser or citric based cleaner to completely

clean the sprayer. The lanolin dissolves in hot water, with the degreasers or with citric based detergents. Spray deposits come off with the lanolin. (Check safety of the degreasers on rubbers first.)

Note: Better to use a degreaser or a citrus based cleaner or similar as some truck washes are not as effective on lanolin based sprays. Best option is to use a hot wash pressure washer and a citrus based cleaner.

- **Re-coat the sprayer with lanolin**

Using a Lanolin based product improves ease of cleaning as well as provides good anti-corrosive protection to sprayers and other agricultural machinery.

What's new in publications

Grow me instead – A Guide for Gardeners in New South Wales

The Nursery & Garden Industry have produced this booklet to identify common garden plants that have now become environmental weeds in various areas and suggest alternative plants that benefit garden diversity, whilst lessening their potential to become weeds in the future.

View on the Nursery Industry Association website <http://www.ngia.com.au/>

Blackberry control manual

This manual is designed to provide current information on blackberry best practice management for land managers, weed officers, extension officers and others involved in the management of blackberry.

Go to <http://www.dpi.nsw.gov.au/>

Printed copies can be ordered through the I&I NSW Bookshop Email: bookshop@industry.nsw.gov.au or call 1800 028 374.

New organic era for growers and consumers

Source: November 2009 edition of *Agriculture Today*.

The 900 submissions received by Standards Australia contributing to the new Standard for Organic and Biodynamic Produce set the record for a single standards development process. It was an extraordinary level of industry and consumer interest, according to Craig Sahlin, chair of the Standards Australia organic and biodynamic technical committee. The standard remains voluntary, similar to existing standards in Australia.

A key upgrade was the development of a framework to recognise equivalent international standards for inclusion in certification procedures for organic and bio-dynamic products.

“This is crucial for the integrity of the domestic market because something like 70 per cent of this market includes composite products containing some ingredients, such as organic chocolate, that cannot be sourced locally in sufficient quantities or at all,” Mr Sahlin said.

Mr Sahlin, Deputy CEO of the Food Authority within Industry and Investment NSW, says significant changes have also been made to the provisions covering synthetic feed supplements, biodynamic production, and processing aids for wine making.

The new Standard, along with other relevant standards, will beef up the benchmark against which the Australian Competition and Consumer Commission can investigate fraud and mislabelling.

Uncertified products, or products with questionable organic integrity, have eluded industry and the courts.

The chair of the Organic Federation of Australia, Andre Leu, says for certifiers and certified clients, it's business as usual.

“The difference is that the standard will help the courts, which can now be confident of a benchmark, rather than try to determine why one private standard is better than the other,” said Mr Leu, also vice president of the world body, the International Federation of Organic Agricultural Movements.

“It does not stop certifiers having private standards, the important thing is that they are aligned with the Australian Standard to end confusion for the courts over deciding which of multiple private standards are the ones to use.”

Hence courts can use existing regulations under the Trade Practices Act to protect the integrity of products labelled as organic.

Discerning consumers will need to continue to read labels and marketing claims, and only buy a product if it is clearly labelled with a certification mark.

Craig Sahlin said the drive by progressive leaders from private standards controlled by the industry to standards made and maintained by a transparent, objective and public process with broadly based stakeholder input, reflected an element of maturity in the industry.

“Trust Organic”, a national two week awareness campaign by the Organics Federation of Australia accompanied the introduction of the standard.

At the launch in Sydney in October, Deputy Director-General of Primary Industries, George Davey, said the standards were representative of the whole sector, consumers, traders and farmers.

“The campaign presented the message to consumers that they can trust organic and biodynamic products that are certified,” Mr Davey said.

Mr Sahlin said the passion and commitment of the men and women who make up the industry was tempered now by commercial nous and an understanding that the industry needed to mature in a number of ways.

A key to sustainability would be the continued development of the Standard to acknowledge practical realities of mass commercial production without compromising the principles upon which the industry was founded, he said.

Contact Scott Seaman, Bathurst, (02) 6330 1209, scott.seaman@industry.nsw.gov.au, and visit www.dpi.nsw.gov.au/agriculture/farm/organic, or Andre Leu, 0428 459 870, chair@ofa.org.au and visit www.ofa.org.au

Bushfires: Prepare.Act.Survive.

It is your responsibility to prepare yourself, your family and your home for the threat of bushfire. You need to act decisively in accordance with your [Bushfire Survival Plan](#) when bushfires threaten. Your survival depends on your preparations, and the decisions you make.

Prepare

Prepare a [Bushfire Survival Plan](#) and discuss it with your family. One of the most important decisions you need to make to protect you and your family is will you 'Leave Early' or 'Stay and Defend' a well prepared property. Regardless of your decision, preparation is the key to survival.

- If you are going to leave - prepare for where you are going to go, how you are going to get there and what you are going to take.
- If you are going to stay, you must have a plan for how you are going to survive and where you will shelter. Know what equipment you need.
- Have a contingency plan - know where your nearest Neighbourhood Safer Place is.
- You need to be both mentally and physically prepared to carry out your survival plan.
- Prepare your home and property to survive a fire front and ensure you have adequate levels of insurance.

Act

Fires can threaten suddenly and without warning so you must be prepared to act without waiting for a warning.

- Don't 'wait and see'. Put your preparations into action.
- Know what the [fire danger rating](#) is for your area.
- Watch for signs of fire, especially smoke and flames.
- If you receive a [Bushfire Alert](#), take it seriously and act promptly.
- Look and listen for information on TV, radio, the internet, mobile phones and neighbours.
- Only consider staying and defending if you and your property are currently well prepared.



Survive

Your life and your family's lives are always your first priority during bushfires. The safest option is always to be away from a fire, but recognise that a warning may not always be possible.

Know the location of your nearest Neighbourhood Safer Place or other locations that may provide you with greater protection.

Being involved in a fire will be one of the most traumatic experiences of your life.

On days of Catastrophic [fire danger rating](#) leaving is the ONLY option to ensure you and your families' survival and on days of Extreme fire danger rating leaving is the safest option.

Failure to take action can result in death or injury to you or your family members.

In an Emergency Call Triple Zero (000)

For the latest information on current bush fire incidents and warnings Visit www.rfs.nsw.gov.au

**NSW RFS INFORMATION LINE
1800 679 737**

Bush Fire Survival Plan



Available at www.fire.nsw.gov.au/page.php?id=315



Stockholm convention decision on endosulfan

Extracted from the APVMA Regulatory Update #86 October 2009

The Persistent Organic Pollutants Review Committee (POPRC) of the Stockholm Convention on Persistent Organic Pollutants met in Geneva on 12–16 October 2009 and agreed that the insecticide endosulfan satisfied the criteria as a persistent organic pollutant.

Following this decision, the Secretariat of the Convention will now invite all Parties and observers to provide technical comments and socio-economic information to enable the POPRC to evaluate possible control measures for endosulfan.

The outcome of this process will be the development of a draft risk management evaluation that considers such matters as alternatives, assessments of the positive and negative impacts of implementing possible control measures, waste and disposal implications, access to information and public education, and the status of control and monitoring capacity.

This evaluation will be developed and assessed at the next POPRC meeting in October 2010.

If the POPRC agrees that endosulfan passes the risk management evaluation phase, then in May 2011 a Conference of the Parties (to the Convention) will consider this evaluation and decide whether or not to list endosulfan and which control measure (ranging from restriction to elimination) is appropriate.

Australia is required to ratify the listing of any new chemical under the Convention before obligations apply. Although there is no deadline by which this must occur, it is expected a decision could be made within 12 months of listing. Ratification of an elimination decision would trigger a domestic process that may lead to the de-registration of endosulfan in Australia.

The POPRC decision and the Australian position on endosulfan

The current POPRC decision was based on the criteria listed in Annex E of the Convention, namely that endosulfan is persistent, bioaccumulative and has the potential for long-range environmental transport and adverse human health or environmental effects.

Endosulfan is currently registered in Australia where its use is limited and tightly regulated following a formal review that concluded in 2005. Its availability in Australia relies on the Australian Pesticides and Veterinary Medicines Authority (APVMA) being continually able to be satisfied that such use satisfies key tests defined in s.34 of the Agricultural and Veterinary Chemicals Code Act 1994. These tests relate to occupational health and safety, human health, the environment and international trade.

Information from a range of feedback loops such as the National Residue Survey, the Adverse Experience Reporting Program, and monitoring through the States and Territories indicates that endosulfan is being used safely in Australia.

Decisions by the APVMA, however, are science-based. New information is being constantly considered. Recently, for example, the APVMA asked the Australian Government Department of the Environment, Water, Heritage and the Arts (DEWHA) to review a range of new scientific studies about endosulfan. A number of these relate to long-range environmental transport.

Advice from DEWHA on these studies is being sought by the APVMA to determine if further regulatory action is warranted in Australia. Any such action would occur independently of processes under the Stockholm Convention although, of course, the ratification of a Convention decision to eliminate the production and use of endosulfan may automatically lead to de-registration and removal of endosulfan products from the Australian marketplace.

Biopesticides working group established



Source: APVMA regulatory update, #88 November 2009

In recognition of the growing demand for Agricultural Biological Products (biopesticides), the APVMA recently established the Agricultural Biological products Working Group.

Consisting of evaluators from across the APVMA who have a special interest in biopesticide products, this group will provide a specific focus and a single point of contact for stakeholders regarding the regulation of biopesticides.

The terms of reference of the working group include :

- Serve as a specialist/focus group for Agricultural Biological products (Biopesticides) within the APVMA;
- Serve as the primary point of contact for enquires and pre-submission interaction for prospective applicants and others on Agricultural Biological products;
- Review and update current APVMA guidance documents on Agricultural Biological products;
- Monitor and maintain a brief on current and emerging issues associated with Agricultural Biological products;
- Conduct associated project work as required.

Definition of Agricultural Biological Product:

“A biological chemical product is an agricultural chemical product where the active constituent comprises or is derived from a living organism (plant, animal, micro-organism, etc.), with or without modification. This includes many products that are commonly referred to as ‘botanicals’, ‘organics’ or ‘herbals’ (where the active constituent comprises an extract derived from an organism rather than the whole organism, it may be accompanied by unidentified components).”

The Biologicals Guideline mentions four major groups of biological products:

- Group 1: biological chemicals (e.g. pheromones, hormones, growth regulators, enzymes and vitamins)
- Group 2: plant and other extracts (e.g. plant extracts, oils)
- Group 3: microbial agents (e.g. bacteria, fungi, viruses, protozoa)
- Group 4: other living organisms (e.g. microscopic insects, plants and animals plus some organisms that have been genetically modified).

Each of these groups of biological products is described in detail in Section 3 of the Biologicals Guideline. The Biologicals Guideline is found at www.apvma.gov.au.

Perfection Fresh wins rights to commercialise the first Australian bred seedless mandarins

***Extracted from the Perfection fresh website
November 11, 2009***

CSIRO has awarded Sydney-based fresh produce marketing company, Perfection Fresh Australia, the rights to commercialise two new seedless mandarin varieties bred by CSIRO.

CSIRO plant breeder Dr Stephen Sykes said the varieties – Merbeingold 2336 and Merbeingold 2350 – were the first two seedless mandarins to be deliberately bred in Australia and were the result of more than 20 years’ research and development.

Perfection Fresh and CSIRO are yet to allocate the varieties a brand name for commercial fruit sales.

Dr Sykes made the announcement at the Citrus Australia National Conference held in Mildura, Victoria from November 8-11.

Perfection Fresh chief executive officer, Michael Simonetta, said Perfection Fresh was now seeking expressions of interest from experienced citrus growers to produce what would be the first specialty mandarins it would take to market. “This is a tremendous opportunity for Perfection Fresh and the growers themselves to move into the seedless citrus market which has enormous, and largely untapped, potential in Australia,” Mr Simonetta said.

“While Perfection Fresh has marketed seeded citrus lines both in Australia and in the export arena for some time, there has been an increasing demand for seedless varieties from consumers around the world. Based on our successful experience with marketing seedless grapes, we are confident seedless mandarins will be a consumer citrus choice of the future.

CSIRO general manager business development, Lionel Henderson, said the selection for a commercialiser began over two years ago when expressions of interest were in the two varieties were first sought. Perfection Fresh was selected from among seven applicants, he said. “The licence allows Perfection Fresh to manage the production

and supply of these varieties. Growers will be registered to produce the fruit and supply to Perfection Fresh,” Mr Henderson said.

Dr Sykes said the two released varieties originated from a series of controlled crosses first devised by CSIRO in 1984 to recombine the characteristics of popular Imperial and Ellendale mandarins for selection under Australian conditions. “In 1992 we started looking at the family resulting from those crosses and identified 10 promising hybrids which were sent to growers at 10 different sites around Australia. These two marketable varieties emerged from the trials,” Dr Sykes said. “These varieties have slightly different traits that contribute to their seedless characteristic, and accordingly, registered growers will be provided with information to maximise the production of seedless fruit. “The seedless Merbeingold 2336 matures from June to July and Merbeingold 2350, during late July to August.” “Because the varieties will be marketed under one brand name, this effectively increases the seasonal availability of the new seedless mandarins from June to August. The ability of these new varieties to store for eight weeks extends the season even further.”

Dr Sykes said both varieties produced sweet, juicy and easy-to-peel fruits which readily separated into segments. “They both produce attractive bright-orange fruit with thin, yet robust skins which will suit export conditions and was one of the key characteristics we sought to achieve,” he said. “In Europe and the United Kingdom where seedless citrus fruit have been available for a long time, consumers expect nothing less and in Japan, seedless mandarins are paramount. In the 1980s, CSIRO and the citrus industry foresaw the potential for an expanding market for seedless, convenient citrus fruits and a breeding program was started to develop unique Australian varieties.” Australia’s citrus industry accounted for less than one per cent of world production with mandarins representing about a fifth of the industry, Dr Sykes said.

The first Merbeingold mandarin trees are expected to be grafted onto rootstocks in nurseries in early 2010 to produce commercial quantities of fruit within three years.

CSIRO’s breeding project is part of the National Citrus Scion Breeding Program and also involves

Queensland’s Department of Primary Industries and close collaboration with Australia’s citrus industry. This breeding program was funded by Horticulture Australia Limited (HAL) using the citrus levy and matched funds from the Australian Government. Other seedless varieties from the program are currently under development in trials around Australia.

For further information contact:

Lucy Howkins, Marketing manager, Ph: (02) 9763 1877.

New export fees and charges

Source: Newsletter, 4th December 2009

The government is funding the Export Certification Reform Package, worth \$127.4 million over the next eighteen months to mid 2011. It includes a new set of export fees and charges to return industry to full cost recovery.

From 1st December 2009 AQIS export certification and inspection services will return to full cost recovery with the reintroduction of the fees and charges.

As part of the Export Certification Reform Package there is \$85.3 million for fee rebates to assist exporters to transition to the new fees and charges. This funding will be used to provide a 40 percent offset of the full cost impact on export industries to 30 June 2011. The rebates will be automatically applied to all invoiced fees and charges.

Charging Guidelines are available on the AQIS website www.aqis.gov.au from 1st December 2009 or contact AQIS Barmera on 08 8588 1408 or Adelaide on 08 8201 6037.

New HAL website launched

The HAL website has undergone a comprehensive redesign resulting in greater functionality and better access to a broader range of information. The new design makes it easier for visitors to the site to access accurate, up-to-date information on projects, including the contact information of administrators and researchers. The HAL website can be found at www.horticulture.com.au



Coastal Fruitgrowers' newsletter

www.industry.nsw.gov.au

The Coastal Fruitgrowers' Newsletter is a quarterly publication distributed in Spring, Summer, Autumn & Winter. It is available free to all commercial fruit growers in the Sydney Basin, Central Coast, Hunter Valley, South Coast & North Coast areas.

I&I NSW – Who to contact

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Phillip Wilk – District Horticulturist
Mobile 0411 139 567

Camden 02 9735 9605

Lawrence Ullio – District Horticulturist –
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Flemington,
Mobile 0412 436 871

Gosford 02 4348 1900

Sandra Hardy – Industry Leader-Citrus
Mobile 0412 425 730

Maitland 02 4939 8888

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