

COASTAL FRUITGROWERS' NEWSLETTER

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No. 48 Autumn 2003

Dear Growers,

Welcome to the first edition for 2003.

In this issue a substantial amount of space has been devoted to two articles on drip irrigation. The reason for this is that there is not a lot of information out there on how to successfully use drip irrigation in tree crops.

A lot of orchardists in the last few years have either converted or are thinking of converting from microjet/minisprinkler irrigation to drip irrigation.

These articles written by Chris Bennett from South Australia give a very good insight into the basics of drip irrigation and managing this system in a tree crop - I hope you find them useful.

There's also lots of other interesting news to catch up on.

Happy Reading.

Sandra Hardy



NSW Agriculture

Fruitgrowers' Newsletter
Edited by Sandra Hardy
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Cathryn McMaster

The information contained in this publication is based on knowledge and understanding at the time of writing. However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Agriculture or the user's independent adviser. Inclusion of an advertisement or sponsor's symbol in this publication does not necessarily imply endorsement of the product or sponsor by NSW Agriculture.



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Analysis (w/v)	42.5% Nitrogen Total (21.5% Nitrogen as Urea 10.5% Nitrogen as Ammonium 10.5% Nitrogen as Nitrate)	30% Potassium as thiosulfate 25% Sulfur as thiosulfate	16% Nitrogen as ammonium 34% Sulfur as thiosulfate	12.6% Nitrogen as nitrate 18.1% Calcium as nitrate	1% Nitrogen as ammonium 12% Phosphorus as water soluble 24% Potassium as phosphate
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Developing a Good Root System with Drip Irrigation

Chris Bennett, Industry Development Manager, Australian Almond Growers' Association

The almond management trial being undertaken by the almond industry at CT Farms in the Riverland is studying nutrition, irrigation and canopy management in great detail. While only in the early stages, some significant lessons are being learnt about these three crucial management factors. Some of the most important lessons are coming from learning how these factors all interact, and the way tree performance can be greatly improved by getting the “balance” right.

Towards the end of the last growing season we dug some trenches to get an idea of root development under the different treatments. The results were staggering. While we expected to be pleased with the growth, we were not expecting the spectacular results that the trenches revealed, or the clear and strong differences between the treatments applied. These treatments were daily irrigations with pulsing, daily irrigations without pulsing and irrigating at two to three day intervals.

In many ways a good root system is the key to plant health. As a result, the root system is also an excellent barometer in assessing overall management performance, particularly in regard to soils and irrigation.

Trees always grow in balance, that is the root system will develop in proportion to the canopy. A weak root system will never support a vigorous top and vice versa. However, that is not to say that because a tree is healthy it is performing to its maximum, either in crop or in growth. More usually, this is not the case. A tree may be performing at say 80% of its genetic potential and be very healthy and commercially acceptable. What we need to be aiming at is maximizing the opportunity for the tree to perform at its maximum potential, by assisting it to grow as well as possible. Many important

lessons have already been learnt in developing good root systems through the trial.

As I have said many times at the field days, there is a big difference between the wetted patterns generated depending on the frequency of irrigations. The diagrams below illustrate the basic differences. The normal way of irrigating every two or three days gives a relatively small wetted area. Daily irrigations increase the wetted area significantly, while the increase with pulsing is spectacular. In our sandy Mallee soils usually considered “difficult” to wet adequately with drip, with daily pulsing we achieved nearly full coverage. The root systems are six metres wide in a continuous strip down the rows. This is counting only areas of active and relatively dense feeder roots. Larger anchor roots and some feeder roots usually extended further.

Importantly, the roots proved to be extremely healthy, active, white and turgid. Roots that snap like a carrot and are white internally are a good sign. Good aeration greatly assists this development, as does moisture. The old theory that roots will grow deeper if soils are kept drier is not true. They do not “chase” water as soils dry out, but rather thrive in an aerated, moist environment. The important feeder roots do not grow into dry soil.

The ideal root system is extensive and consists of a good balance between the fine feeder roots and the larger anchor roots. The feeder roots are the most active in absorbing both water and nutrients. If you can get these to spread out widely you have two major gains. Firstly, the larger wetted area being utilized gives a much larger usable reservoir of water and nutrition. The tree is better able to take these up as required and the soil environment is more stable. If hot weather suddenly comes along the tree has ample reserves to tap into. This is not always the case with smaller wetted areas. This was clearly demonstrated last year in January when the trees being irrigated every two days quickly stopped growing.

Illustration of typical wetted profile when irrigating every two or three days.

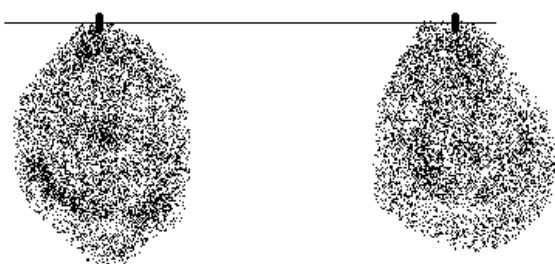
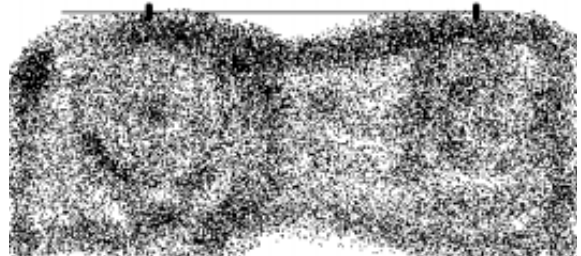


Illustration of typical wetted profile when using daily pulse irrigations.



This was the case even though the soil moisture monitoring equipment indicated “adequate” moisture. Secondly, the wider profile makes it simple to add irrigation and nutrition without the fear of unplanned leaching and subsequent losses. The tubular wetted areas with infrequent watering are easy to fill and water quickly travels down and out below the roots, taking dissolved nutrients with it. The frequent pulsing irrigations move the water and nutrients sideways, as well as down, keeping both water and nutrients in the rootzone. This works because whenever the irrigation pulse stops, the water has less vertical hydraulic pressure and tends to “fan out” as the soil moisture equalizes. The more pulses, the greater the opportunity to widen the wetted area. The result is a much more extensive root system. It is then far easier to manage soil moisture and nutrient levels and efficiencies are high. This greatly increases the ability to maximize tree growth and cropping potential.

It is important to note also that neither pulsing nor more frequent irrigations means applying more water. You only replace the water used by the trees. This may well be greater due to the larger canopy developed under the pulsing drip system, but increased water efficiencies will easily compensate for this. Overall, we do not expect that water usage under drip will necessarily be less than sprinklers for this reason. However, in the case of very young trees and possibly mature trees, there may be significant savings. For growers who are facing shortages of water, drippers are likely to contribute significantly by reducing losses and making these savings available to the trees.

Regardless of the situation, the most important measurement, that of kilograms of nuts produced per kilolitre of water should be greatly improved under drip.



Drip Irrigation: how to make it work for you and your almond trees

Chris Bennett, Industry Development Manager, Australian Almond Growers' Association

Drip irrigation has had a fairly checkered past, and as a result has a very patchy reputation, both in Australia and around the world. It is timely to reevaluate it as a system, especially as there is an increasing interest in it with many crops. In the case of almonds, the major proportion of new plantings is now being done with drip irrigation, a major change over the last two years.

Drip irrigation developed a bad reputation in many areas as early attempts to work with this system were unsuccessful. Often trees and crops suffered badly, with the system usually then being replaced with sprinklers. The subsequent recovery of the trees “proved” that sprinklers were “better” or that drippers were “not suitable”. Either way, it is a fact that drip systems often did not live up to expectations. Growers turned away from drip and sought the “reliability” of sprinklers. However, some growers did make drippers work, often very well and continue to be very happy with the results. Why then, is there such a difference in experiences and opinion?

Drip irrigation potentially provides the grower with an extraordinary amount of control over the precise amount of water delivered to each plant or tree....far greater than for



any other system. With modern, pressure-compensated systems emitter variation (and therefore water delivered to each plant) can be less than 1%. Compare this with a good sprinkler system when distribution uniformity (DU) is good if around 80-85%. However, with this control also comes a much less forgiving system. Get it right and it will perform very well, get it wrong and it can be disastrous.

THE PERFECT IRRIGATION SYSTEM

While there will never be the “perfect” system, we can at least list the important and desirable characteristics. A good system will allow uniform distribution, minimize water losses, provide a healthy root system, be reliable and have both relatively low capital and operating costs. More or less in order of importance, the most key considerations are:

◆ Uniformity of application

If application varies from tree to tree it will be impossible to have the control needed to get optimal performance from the orchard. Tree performance will vary as some will receive either too much or insufficient water and this will be made worse if fertilizer is injected as the nutrition will also vary. With sprinklers, variability across the orchard floor also leads to inefficiencies. This variability (DU) will lead to some areas being over watered while others are under watered. Uniformities of 80 to 85% are considered very good and are all that can be expected of this type of system. However, this



Irrigation every two to three days. Restricted root zone 3.5 metres wide, as shown by line. Note concentration of feeder roots close to drip line. Roots outside this area are mainly larger. Root depth is good at 1.5 metres.



Concentrated feeder roots under the drippers. This mass of concentrated feeder roots is caused by excessive watering. Masses of roots form under the drippers, with few roots elsewhere. This is dangerous as this small area is rapidly depleted by both water and nutrients and difficult to manage properly. The trees can quickly become stressed in hot conditions.



Daily pulsing irrigations. Note extensive root system, 6 metres wide, with feeder roots dispersed over entire area. Only slightly concentrated around drip area.



Close up of pulsing at the edge of the root zone (3 metres from the tree line) to show concentration at the extremity. Note feeder roots actually go further, giving virtually full coverage of the orchard floor. Note also the calcareous layer. Feeder roots did not extend into this layer under any conditions. It is neither a drainage nor irrigation problem, but clearly shows the limitations of using nemaguard rootstock in calcareous conditions.

variability means that where the areas receive above the desired amount, the excess water goes beyond the root system and so is lost, while the drier areas can mean potential salt build up. This factor is most important where leaching water is at a premium or where the water is relatively saline. These factors can contribute significantly to tree health and cropping ability. In addition, if fertilizer is being injected, the wetter areas may carry some of the fertilizer beyond the roots, leading to wastage. (See series of photos)

◆ **Maximum water efficiency**

This is often underestimated and can be a major component in poor tree performance. Maximum efficiency simply means minimum water losses to the tree. However, this is not a simple issue. Losses can and will occur from a wide range of factors. These are in two basic areas; evaporation losses and water lost in the soil profile beyond the root zone, including that deliberately used for leaching salts.

There have been numerous studies done on water losses through irrigation. Factors affecting this include tree canopy size, soil type, irrigation system efficiency, air temperature and humidity, wind strength, wetted surface area and irrigation frequency and duration. In general, sprinklers often lose around 20% of the applied water through evaporation. This can go to 30% in smaller trees and up to 50% in some circumstances. This evaporation comes from the wetted foliage and soil surface and from the droplets as they move through the air. You only have to look at the mist from the sprinklers visible near sunset to get some idea of the problem. Even at the best end of the scale, losses are significant and are not only a huge cost, but often translate into loss of crop if water is limiting. In even mildly saline conditions, the evapora-

tion will lead to a significant increase in the salt load applied to the soil and therefore increase the need for leaching irrigations, which further compounds the losses.

Drippers are the clear winners in the efficiency stakes. Losses from evaporation are very low and come only from the very small wetted soil surface. This gives a significant saving in water usage, or as a better way to measure it, the water required to produce a kilogram of almonds.

◆ **Ability to provide a well structured and healthy root system**

Potential problems include dry-salting and water-logging. All irrigation systems will have areas through the soil profile which will tend to be drier. These areas have the potential for a build-up of salinity. This can be a problem if these areas are large, particularly if the dry area tends to shift around. The redistribution of the salt as the areas move also moves the salt to the rootzone with the potential for tree uptake. A good example is where sprinklers are influenced by wind.

Water logging can be the more recognized extreme example, where soils are at least partly saturated. This leads to anaerobic conditions and roots die through drowning. Less recognized are conditions less visible, where over-wet conditions (above field capacity) lead to a depletion of air in the soil. This can be caused by either over-irrigation or poor distribution. This is particularly important in early Spring when trees are growing new or the coming season. In many crops, including almonds, there are two main root growth periods, spring (the most important) and post harvest in the autumn. During both of these periods it is important to keep the soil uniformly moist, but not wet. Aeration is important to root growth and health. It is crucial to get this right, particularly in spring when water usage is low. This is the period when trees are undergoing their maximum root growth and in the case of deciduous crops like almond, trees are also producing new leaves, flowers and crop. Make a mistake here, and significant reduction can be done to both tree health and crop potential. This reduction is not always obvious.

◆ **System reliability**

High maintenance systems are unreliable, expensive and often inefficient. Everyone wants to avoid these. Moving parts wear and need replacement, while jets and emitters can block. The ideal is a system that is mechanically reliable and will not suffer blockages. This type of system can then be automated which allows a much more sophisticated and efficient delivery of both water and nutrients to the crop. Many irrigation systems are chosen because “I like to see the water”. This is a poor substitute for a reliable system that performs efficiently

and helps maximize tree health and therefore crop.

◆ **Low cost**

Both high flows and working pressures mean high capital and operating expenses. High flows mean large pumps, mains and laterals. High working pressures mean higher pumping costs. Obviously, keeping flow rates and working pressures as low as possible, *without sacrificing efficiency or reliability* is a great advantage over the life of the orchard. With some systems there is a direct trade-off here between cost and efficiency. For example, with many sprinklers lower flow rates can mean substantially increased evaporation losses if droplet sizes decrease or irrigation times increase.

◆ **What are we learning from our trial work?**

As previously stated, there is no “perfect” system, and the most appropriate system will depend on many factors

including the crop and property involved. However, in general drip systems if managed properly, do a particularly good job with almonds. Most early attempts to use drip were with early and crude systems and were also usually poorly designed and managed. The understanding of drip systems has totally changed over the last 20 years and the equipment is now sophisticated, reliable and performs well.

However, we need to keep in mind that many irrigation designers and consultants still do not fully understand the system and still view it as a way of “saving water” and manage it similarly to sprinklers. This is totally wrong.

With the system and regime being developed in the trial, the drip system is delivering extraordinary levels of efficiency and reliability and we are able to closely control the delivery of both water and fertilizer to the trees. Our tests show that the variation between the emitters is less than 1%, so each tree gets exactly the same as the others. Reliability is also good with no blockages to any of the 22,000 drippers and with no moving parts, nothing can wear out. Tree health is excellent and the root systems are superb. In addition, our monitoring indicates extremely high levels of efficiency of both water and nutrient uptake.

The Key Points in Managing an Efficient Drip System

1. Build a good wetted profile in Spring. Just prior to the commencement of root growth in Spring, build a full wetted profile to set the trees up for the season. This means wetting up the soil to 1.6 to 2.0 metres deep, depending on soil type and tree size. Also aim for maximum wetted width. This width is achieved with pulsing.



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The aim is to maintain this profile through the season by replacing the water as it is used. In the case of almonds root growth commences two or three weeks before flowering, around early bud swell. The new roots will spread rapidly through this profile over the next few months.

2. Pulsing. Ideally, apply all irrigations in pulses, daily. This means replacing the water the trees used the previous day on a daily basis. Pulses should be a minimum of 1mm each. In practical terms, hourly pulses with an hour spell between works well. In low water usage periods (eg spring) you only water when the trees begin to use a significant amount. For almonds this means from fruit set on.

Pulsing is virtually unknown in Australia, with irrigation consultants still recommending and designing systems for irrigation every two or three days. This is a very old concept and its performance is totally different. The difference in soil wetted areas and efficiency in drip systems increases with irrigation frequency. Basically, whenever the irrigation cycle is stopped, water moves

more laterally, that is sideways. This increases the total wetted volume and the effective root zone as the feeder roots expand out to the wetted area. Daily irrigations are MUCH better than every two days and daily pulses are MUCH better again.

Less frequent and therefore heavier irrigations develop a narrow, tubular wetted pattern under the dripper. It is common to have a series of wetted cylinders along the row. Feeder roots only accumulate in these areas, and can be quite dense. This is a bit like growing the trees in a series of pots. In hot conditions the small area dries out rapidly and it is easy to lose water past the root zone as it travels down rapidly. This wastes water and also the fertilizer it leaches. It is difficult to keep the moisture up to the trees, leading to the common stress experienced in hot weather. Growth will usually stop early in Summer as a result as the tree compensates by balancing the leaf area (which determines water losses) and available water.

Pulsing sounds complicated, but is easy with an irrigation controller, which then does this automatically. It is



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well worth the effort as it is the secret to good drip irrigation and tree response. See further details in "Developing a Good Root System with Drip Irrigation".

3. System Design. This requires some simple but crucial aspects that are usually overlooked at the design stage. Key aspects are:

- **Allow for pulsing.** With hourly pulses, the subsequent maximum irrigation time possible per day is only 12 hours. You need to deliver the maximum daily demand (mature trees, maximum crop in the heat of summer) in twelve hours. Dripper spacing and emission rates will need to allow for this. Even if not intending to pulse initially, allow for it in the design to give the option later. At the very minimum, aim to provide daily irrigations.

- **Use quality drippers** of 4 litres per hour or more emission rate. Under 4 litres can lead to partial blockages as fertilizer residue and/or clay particles in the water slowly settle out. Many designers recommend lower rates, suggesting more uniform application will be achieved with higher dripper numbers. This is neither true, nor necessary, with pulsing and only increases capital costs significantly. You pay for every dripper.

Pressure compensated drippers are best as they will not just allow for undulating ground and help overcome any design errors, but will give the most even distribution. Ensuring the minimum working pressure is well within the dripper pressure working range will force the compensating mechanism to work and give very good results.

- **Use two lateral lines per row.** This helps improve distribution and gives efficient hydraulics. We have dripper spacing of 1 metre and the laterals are each 1 metre from the tree trunk. This works well even in the sandy soils we have.


- **Purchase a good quality and powerful controller.** Many controllers are fairly basic and will either be incapable of doing the job or will be difficult to program. It is well worth the expense of selecting a high-level unit. Keep in mind it will need to pulse and inject fertilizer at particular pulses. Also you will need to regularly vary the water to be applied as this will change with weather and seasonal conditions. This needs to be a simple task.

- **Make sure you have a good filtration system.** This is the key to reliability of drip irrigation. There are many good systems on the market. Stick with well-known brands, experienced in drip installations.

- **Allow for dripper maintenance.** All drip laterals will need flushing regularly to remove the fine sediment that builds up at the end of each line. Frequency depends

on water quality and any sediment is usually mainly fine clay particles, which cannot be filtered out. Flushing can be a simple task if all laterals are connected to a flushing main. There are also some good automatic valves that can be installed at the end of each lateral. Once a year remove any salt deposits in the system by injecting chlorine or phosphoric acid and flushing. This is a good winter job. If both these simple maintenance points are undertaken, you should not have any problems with blockages.

4. Inject all fertilizers. Surface application of fertilizers with drippers can be particularly wasteful, while injection under this system is particularly efficient, allowing accurate placement in the root zone and uniformity across the orchard. Inject all fertilizers in the last one or two pulses for the day so that it is not leached past the root zone. Fertilizer should be injected on the "little and often principle". This will spread the diluted fertilizer throughout the wetted profile where the feeder roots are.

In conclusion, if we are looking to improve orchard performance, we must develop ways to control and drive the trees. We must assist the trees as much as possible to allow them to perform at their optimum. This in turn means having the ability to accurately provide for all the tree's needs. Drip irrigation has the ability to precisely deliver the intended dosage of both water and fertilizer and do it in a way conducive to tree root growth. It can be very reliable and cost effective if well designed and managed and brings levels of efficiency simply not possible with any other system. These are the reasons why it is now being rapidly adopted in many countries. 

Publications

◆ Crime Prevention on Farms

- a new series of information leaflets including:

- Crime on Farm
- General Farm Security
- Identification of Farm machinery, tools and equipment
- Farm machinery theft
- Farmhouse security
- Full tank security
- Seed and grain theft
- Livestock theft
- Illegal Trespassers and Shooters
- Reporting crimes to police
- How to establish a Neighbourhood Watch or Rural Watch Group

For copies of these leaflets contact the Institute of Rural Futures 1800 652 592.





◆ Fruit industries unite to promote healthy eating.

Australian fruit industry organizations are uniting to defend Australia against what they see as a “relentless onslaught by the ‘junk food’ manufacturers that threatens to undermine the health of our children.”

SnackFruit Australia Inc President Mr Bill Hatton, said “the alliance of Australian fruit industry organizations recently expanded to include a total of 11 tropical, subtropical and temperate fruit industries.

SnackFruit Australia Inc. now collectively represents over 8,000 fruit producers, employing some 40,000 people, and supplying product with a farm gate value in excess of \$1 billion. *SnackFruit Australia* Alliance members are:

- Apple & Pear Australia Ltd
- Summerfruit Australia Inc.
- Cherry Growers’ of Australia Inc.,
- Australian Canning Fruit Growers’ Association Inc.,
- Australian Nashi Growers’ Association Inc.,
- Australian Rubus Growers’ Association Inc.,
- Australian Blueberry Growers’ Association Inc., and
- Strawberries Australia Inc.
- Australian Mango Industry Association Ltd.
- Australian Avocado Growers’ Federation Inc.
- Australian Banana Growers’ Council Inc.

Mr Hatton, a sub-tropical fruit grower from the Northern Rivers District of NSW expressed confidence that “our fruit industry alliance has now consolidated its reputation as an effective proactive group, as is evident by the strong interest now being expressed by several other major peak industry bodies, and regional horticultural councils in participating in *SnackFruit Australia* initiatives, including the current National campaign in support of ‘healthy eating’.”

“A highlight of the recent and highly successful *SnackFruit 2002* Combined Fruit Industry Conference, was the strong message articulated by our conference patron, Dr Rosemary Stanton calling on horticultural industries to mobilise to promote ‘health eating’, which is under intense and sus-

tained attack by the ‘junk food’ manufacturers - with horrendous consequences to the health of all Australians.”

“Dr Stanton a respected nutritionist, and high profile advocate of healthy lifestyle, highlighted the tragedy that is now being played out daily in the school tuckshops, the worksite ‘chuck’ wagons, the super-markets aisles, and in any fast food mall across Australia, indeed in front of any television set. The impact of the increasing consumption of high energy, high salt ‘junk food’, and the increasingly sedentary lifestyle on the health of all Australians, in particular our children is very disturbing, so we all should have a strong interest in redressing this appalling situation.”

“*SnackFruit Australia Inc* members will also be working closely with Horticulture Australia Ltd, and the many other industry, community and government groups currently mobilising across Australia to promote healthy eating and healthy lifestyle,” said Mr Hatton.



Horticulture
Australia
Council

**Horticulture
Australia Council
Elects New
Chairman**

Horticulture Australia Council (HAC), the peak industry body representing Australian horticulture, has announced the election of a new Chairman – Mr Bill Hatton.

“Horticulture is a very diverse and expanding industry, with a farm gate value of over \$6 billion and supporting a rural workforce of over 100,000 employees, managers and growers. HAC now provides the horticulture industries with the necessary collective voice”, said Mr Hatton.

“My first task as incoming Chairman will be to complete the appointment process for a permanent secretariat for the Council. the Board is also keen to implement its communication strategy, to build the industry, public and political profile of the Council.”

“Apart from the need for ongoing organisation development to secure the active involvement of all sectors of our industry, there are many other issues the Council need to address.”

“The Council will be initiating a review of its Strategic Plan with the aim of providing a clear

News in Brief : Industry Bodies

focus for the Councils activities over the next several years. Identified priority areas include:

- The need to address the chronic shortage of skilled labour in a rapidly growing industry sector. Horticulture needs a labour market plan, or it risks stalling its current growth trend.
- The need to promote horticulture careers and rural lifestyle to young Australians to reverse the current “greying” of this exciting industry.
- The need to secure sustainable water resources to support the current growth in horticulture production.
- The need to ensure Government allocates more resources to support export market development.
- The need to strengthen Australia’s biosecurity to protect the enormous investment in the horticulture industries that is at constant risk from exotic incursions of pests, diseases and weeds.
- The need to strengthen Trade Practices and other Legislation to address the current market power imbalance that pits small family producers against the supermarket giants.
- Last but not least, to ensure Australian Horticulture is supported by R&D investment, facilities and scientists to maintain our competitive edge and to ensure our products meet consumer requirements.

HAC contacts:

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Tel: (02) 6687 1065
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Correspondence to -
Secretariat: Ms Judith
Damiani

Tel: (03) 5023 6333
Fax: (03) 5023 3877



Websites

- ◆ **The RIRDC website**
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News in Brief : Citrus

◆ “New Varieties” Field Day

The Breeding project, funded by Horticulture Australia from the citrus levy, will be showcased at a special “New Varieties Day” to be held in Renmark on June 19th. This is a day not to be missed by growers.

The aim of the day is to provide growers with as much information on the many new varieties which are now available and will be available into the future. This is not only from a growing perspective but also a marketing perspective with representatives from Mildura Fruit Company and Yandilla Park Ltd speaking on their experiences with new varieties and the challenges involved.

Graeme Sanderson from NSW Agriculture at Dareton will also be presenting further details on the evaluation work that he has been carrying out which many growers are now familiar with. Graeme, along with a number of the other presenters, will have varieties on display.

One of the biggest draw cards on the day will be John Pressler from 2PH in Emerald, Queensland who will be talking on, and bringing with him, varieties which he has

been working on over the past few years, including Taylor-Lee mandarin, which is an easy-peel selection, a seedless Murcott and a seedless Eureka Lemon.

Growers should put this date in their diary now and more details of the day will appear in the May edition of the Australian Citrus News as well as details of how to register.

For more information contact:

Pat Barkley, National Citrus Improvement Manager (Auscitrus). Phone 0247 739 864.



◆ New Citrus Website

A new citrus website has been developed (Season Update) that provides timely information to Australian citrus growers. The web site is a component of the Rind Quality Project. The web site will provide information on current regional pest problems, crop load estimates, heat unit accumulation (fruit maturity), fruit growth and Eto data. To visit the web site, go to the Australian Citrus Growers web page (www.austcitrus.org.au) and select the “Season Update” page from the main menu.



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News in Brief : Citrus



Paul Florissen, Auscitrus Horticulturist, Dareton.

Citrus Rootstock Seed

- The closing date for rootstock seed orders is 30th April 2003. Order forms are available from the Auscitrus Secretary 02 4325 0247. Please note that all new accounts require pre-payment prior to dispatch.
- At the request of some citrus nurseries, Auscitrus is trialing the earlier supply of some rootstock seed varieties in 2003. For example, *Poncirus trifoliata* will be available from May 2003 and Troyer citrange will be available from June 2003. Later maturing varieties such as Cleopatra mandarin will not be available until July/August 2003.
- Auscitrus supplied more than 700kg of rootstock seed during the 2002 season. Varieties in high demand were *Poncirus trifoliata*, Troyer citrange, Carrizo citrange, Rough lemon and Swingle citrumelo. Increased amounts of Swingle citrumelo and Cox hybrid seed were obtained from new source plantings at Dareton and Monash in 2002. Auscitrus also expanded seed source plantings at Dareton in spring

2002 with the establishment of another 300 seed trees to supply increased amounts of *Poncirus trifoliata*, Flying dragon, Troyer citrange, Cleopatra mandarin, Rough lemon and *Citrus volkameriana*.

Old Varieties – New Opportunities

Whilst most current variety research is focussed on recently imported or locally bred varieties, Auscitrus has a large number of older budlines available to growers and nurseries. Most of the varieties listed below are currently produced for market niches but may have greater commercial potential: Amigo mandarin, McMahon Seedless Valencia, Ryan navel, Benyenda navel and Atwood navel.

Importation of New Citrus Varieties

Since 1986, all citrus varieties imported and released to the Australian citrus industry by Auscitrus have been available as public varieties ie. available to all growers and nurseries. A relatively new development in Australian citrus production is the concept of patented produce. Licensees or commercialisers will be important in the future, with licensees required to pay access fees to obtain new varieties locally or overseas. Growers will be required to sign non-propagation agreements and pay tree royalties and possibly a 'box' or sale royalty on all fruit produced.

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News in Brief : Citrus

Auscitrus will continue to multiply and distribute new public varieties and will also work with commercialisers to ensure that patented varieties required by the industry are imported, independently evaluated and supplied as high health status propagation material through the

Auscitrus scheme. To assist in making informed and timely decisions on which new citrus varieties to import, a variety import committee of citrus industry leaders has been formed:

Mike Arnold (Chairman), Citrus Grower, SA
Arthur Edwards, Yandilla Park, SA
John Chavarria, Mildura Fruit Company, Vic.
Peter Walker, Riversun, SA
Stewart Dobson, Kimberley Produce, WA
Troy Emmerton, Citrus Grower, Qld
Joe Severino, Pacific Fresh, NSW
Graeme Sanderson, NSW Agriculture
Pat Barkley, National Citrus Improvement Manager

Recent developments in this area are:

- Importation of patented varieties from Israel (Mor, Or, Winola, Nectar) by the Australian Nurserymen's Fruit Improvement Company (ANFIC). The varieties will be independently evaluated through the Australian Citrus Improvement Program project funded by Horticulture Australia Limited (HAL). Auscitrus will multiply budwood of the new varieties but commercialisation will be done by ANFIC.
- Auscitrus has commenced multiplication of Taylor Lee mandarin from Queensland following disease elimination. Commercialisation will be done by Golden Grove Pty Ltd and independent evaluation has commenced with reworking of trees at Dareton through the Australian Citrus Improvement Program project funded by HAL.
- Auscitrus is negotiating with the Queensland Department of Primary Industries (QDPI) to multiply budwood of two less seedy Murcott selections following disease elimination. Commercialisation will be done by Breeder's Rights International.
- Auscitrus is importing Nour and Sidi Aissa clementines from Morocco and Primosole mandarin from Italy.

New Citrus Variety Update

Graeme Sanderson, NSW Agriculture.

- Reworked trees of Taylor Lee mandarin and Cara Cara red fleshed navel were successfully established at Dareton in spring 2002. Initial fruit for grower evaluation is expected in 2005.

- Initial fruit samples of Fulwood navel from trees free of Citrus Tatter Leaf Virus will be available for grower evaluation at Dareton in 2003. Fulwood navel is an early season variety with medium/large fruit size.
- Most new mandarin varieties under evaluation at Dareton have shown medium to high cropping levels in 2003. Satsuma mandarins (Okitsu wase and Miho wase) have the highest level of heat damage ever for satsuma varieties due to extremely hot weather in December 2002/January 2003. Afourer mandarin has continued to display heavy cropping this season (hand thinning required) following a large initial crop in 2002. Afourer appears to have relatively low susceptibility to sunburn, with minimal heat damage this summer.
- The Cant selection of Star Ruby grapefruit showed superior late season attributes when compared to the Californian selection at Dareton in 2002. Cant Star Ruby maintained high quality external appearance and good internal flesh colour whereas the California Star Ruby selection was showing deterioration of external appearance and internal colouration in November/December 2002.

Videos on reworking and budding of Satsuma mandarin in Japan

A series of DVD compatible videos featuring Satsuma growing in Japan are now available. The videos include footage of some reworking and budding techniques used in Japan, and were taken by Steven Falivene in 2001, during a 10-month satsuma study program. There are three videos currently available:

1. Satsuma thinning (21min), reworking (10min), budding (12 min), irrigation (12min), and harvesting (12min).
2. Satsuma pruning (55 min) & field day (13 min).
3. Satsuma packing (38min), harvesting (12 min) & field day (13 min).

The videos are in video compact disk format (VCD), which is a similar quality to a standard VHS and can be viewed either on computer or on TV through most standard DVD players. The videos are available for purchase at \$5 each or all three are available for \$12. Contact Steve Falivene, District Horticulturist, NSW Agriculture, Dareton, ph 03 5027 4409, E-mail steven.falivene@agric.nsw.gov.au





Extracted from

Food S@fety Bytes

Edition 4 January 2003

◆ New Australia-wide Food Standards Code starts

The new joint Food Standards Code for Australia and New Zealand came into force from midnight (Dec 19 2002) for all foods manufactured on or after 20 December 2002. Parliamentary Secretary for Health Trish Worth said the new Food Standards Code is good news for Australian and New Zealand consumers, because nearly all manufactured food will now show details of kilojoules, protein, fat, saturated fat, carbohydrate, sugar and sodium (salt). Ms Worth also said there were “considerable benefits for the food industry. Industry has been freed up to be innovative as there are no longer prescriptive, old-fashioned, recipe-based standards.”

The new Food Standards Code can be viewed on the FSANZ website www.foodstandards.gov.au.

◆ Plant Products Safety Scheme

A scoping study done by Food Science Australia identified the following five plant product groups as high risk in relation to food safety – fresh cut vegetables usually consumed raw, fresh cut fruit, vegetables in oil, unpasteurised juice and sprouts. A reference group was set up of members representing industry, State agencies, consumers and technical areas. A meeting of the reference group last December endorsed that the five high-risk plant products groups should be the initial focus of a Plant Product Food Safety Scheme, due to the vast range of plant product foods. Sector working groups were formed with industry and interstate agency participants to discuss the risk management of food safety. Model Food Safety Programs for the five plant products groups have been prepared. Risk mitigation measures and the Programs have been independently assessed for scientific integrity. The risk management work will form the basis for regulatory requirements and a user-friendly Plant Products manual, which will specify in detail technical aspects of regulatory requirements. The next step is the preparation of the drafting instructions for the regulation and Regulatory Impact Statement (RIS).

◆ Bruised fruit may be valuable – FSNet Jan 8/03

Fruit growers may soon have a market for their bruised produce. Bruised fruit may have some hidden benefits, according to a study by Agriculture Canada in Summerland. Bruised fruit contains a compound called phenolics, which can fight the *Listeria* bacteria, which causes food poisoning. It's hoped further research will

lead to a natural preservative for some food products.

◆ Links on the Net

SafeFood NSW: www.safefood.nsw.gov.au

Food Standards Australia New Zealand:

www.foodstandards.gov.au

NSW Health: <http://www.health.nsw.gov.au/public-health/food/index.html>



◆ First National Farmers' Markets Conference Report

Extracted from Organic Federation of Australia Inc Newsletter, January 2003.

The rapid rise in popularity of farmers markets around Australia has resulted in the formation of the Australasian Farmers' Markets Association. Over 65 delegates at the first national Farmers' Market Conference held in Bathurst recently, voted unanimously to establish the national body and to adopt the mission, aims and definition of the Association's inaugural charter.

'Farmers' Markets are increasingly a pivotal part of Australia's fresh food chain,' commented Conference Chairperson, Jane Adams. 'There are now over 40 community-based markets trading regularly in regional centres and capital cities across Australia. 'It has taken three years to reach this critical mass. Those active in this vibrant grassroots food movement wanted to establish a national hub and general charter to ensure the authentic viability of existing Farmers' Markets and to foster the development of new markets in interested host communities.'

The Australasian Farmers' Market Association (AFMA) comprises one representative per state and territory, and one from New Zealand under the interim national chairperson, Jane Adams.

Farmers' Markets operate regularly in all states, including Albury, Wagga, Dubbo, Cowra, Orange, Mudgee, Wauchope, Armidale, Tamworth and Byron Bay in NSW. Sydney currently hosts six major Farmers' Markets in Liverpool, Camden, Pyrmont, Castle Hill, North Sydney and Moore Park.

The conference, and the association, are for all farmers' markets, both organic and conventional. David Roby, one of the founders of the Lismore Organic Markets, was at the conference and presented a workshop. Proceedings of the conference will be available in the near future, and a long awaited list of Australian growers' markets will be compiled as well.

For information contact:

Jane Adams, Conference Chairperson,

phone (02) 9360 9380 Email: jacom@bigpond.net.au



News in Brief : Other

◆ Soil Health Card

Extracted from Organic Federation of Australia Inc Newsletter, January 2003.

The Soil Health Card is a simple and effective way to monitor soil health on your property. Developed by Tuckombil Landcare, NSW Agriculture, and the Natural Heritage Trust, it is a simple system that could be used by both organic and conventional farmers. The following is from the Tuckombil Landcare website (www.lis.net.au/~tuckland/). This soil health card was developed for the Northern Rivers Region of NSW as an extension activity of the Good Soils Project, a joint undertaking of Tuckombil Landcare Inc and NSW Agriculture in partnership with the Natural Heritage Trust.

The card was developed through a series of workshops held at Wollongbar TAFE. Primary producers representing a range of industries and one urban gardener attended the workshops. The process was facilitated by staff of Wollongbar TAFE and NSW Agriculture. Participants are acknowledged individually on the back of the health card folder. The aim was to develop a practical tool that all landholders in the Northern Rivers

Region can use to monitor the health of their soils. As the core of the card, the team came up with a list of 10 straightforward visual tests that require simple equipment and can be carried out by one person in the field.

The soil health card lists the 10 tests and provides space for you to rate your own soils after carrying out the tests. By testing regularly and keeping the cards, you can build up a record of your soil health, and understand the effect of management practices on soil health. Regular testing will show improvements in response to more sustainable management such as use of mulch in orchards, or minimum tillage in crop rotations, and allow early detection of developing soil problems. Test results can also be used as the basis for discussion about management changes with other landholders and with agricultural advisers.

This card is not intended to replace any soil testing that you may already carry out. It is another tool to help you understand your soils and their productivity. Maintaining soil health in the short term will undoubtedly increase the sustainability of farming into the future.

For information and to obtain the Soil Health Card, contact David Rody at robvalst@nrg.com.au



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◆ Trich-A-Soil Granular

An Australian company, Organic Crop Protectants P/L (OCP) has released the first Australian *Trichoderma sp.* in a granular form, namely Trich-A-Soil Granular. Trichoderma is a beneficial fungus that colonises around plant roots and creates a biological barrier to soil diseases including Pythium, Rhizoctonia, Fusarium, Phytophthora and Sclerotinia.

Trich-A-Soil is the culmination of 10 years of research by NSW Department of Agriculture researcher Dr. Percy Wong. The focus of Dr. Percy's research was to isolate effective native strains of Trichoderma for disease control purposes. Further development work was carried out by Bio Care Technology P/L at Somersby in NSW to commercialise the uniquely Australian strain and develop quality control criteria. While the powder formulation (Trich-A-Soil WP) is popular for drenching and spray applications, Trich-A-Soil Granular was developed to give users an alternative, easy-to-apply formulation suitable for nursery, floriculture, ornamental and landscaping uses. The formulation is easily incorporated with current products, and easy to include in various potting media and mixes.

Trichoderma products are gaining popularity in Australia for a number of reasons including increasing OH&S concerns with the restrictions to the handling and use of scheduled pesticides in the workplace. The high level of user-safety makes Trich-A-Soil Granular a viable alternative for suppressing "damping-off" root diseases while reducing all of the problems associated with using pesticides.

Trich-A-Soil Granular is unique in that it has the highest viable colony-forming-unit (cfu) count of any product commercially available. Research has shown that higher cfu counts result in more effective Trichoderma colonisation levels at the root zone and greater plant root protection. Further research continues with Trichoderma as to its growth stimulant effects and possible links with enhancing the natural immune system of plants.

Trich-A-Soil Granular is 100% Australian made and owned. For further information, contact Organic Crop Protectants P/L on Ph: 02 9810 4566.

E-mail: info@ocp.com.au. Website: www.ocp.com.au.



◆ New Herbicide Marketed

Karen O'Malley, Horticulturist (Organics), NSW Agriculture, Bathurst.

A firm in New Zealand has developed and recently begun marketing "Organic Interceptor," a non-selective, contact spray herbicide cleared for use in organic agricultural production. Interceptor is derived from the

liquid residue created when pine trees are processed to produce pulp and paper, then blended with other natural components to create the final product. According to the manufacturer, it is "not a systemic poison" and "leaves no harmful residue." Interceptor's mode of action is dehydration; it starts working within 15 minutes of application, and after 5 days treated plants are completely dead. The product "penetrates green tissue and disrupts normal membrane permeability and cellular physiology". Disrupting the cell membrane causes cell leakage, desiccation, and the collapse of all contacted tissue." It has a natural tendency to foam, a feature that can be enhanced by delivery through specialized nozzles. The recommended starting mixture is one part Interceptor to four parts water (a 20 percent mix). Best results are achieved by applying during warm, sunny conditions; application during rain or cold weather should be avoided.

For more information contact:

E. Stevens, Certified Organics,

E-mail: E.Stevens@certified-organics.com.

Fax: 64-9-525-3462. Phone 64-9-525-3432.

Web: <http://www.certified-organics.com>



◆ Algicides for Farm Dams

Lee Cook, Veterinarian (Chemical Control), NSW Agriculture, Orange.

As dams dry up large numbers of farm dams are being affected by blue-green and similar algae. Blue-green algae are potentially fatal to stock drinking the water.

Only two products, both based on chelated copper, are registered for treatment of farm dams in NSW. They are Coprol Aquatic Algicide® and Cupricide 110 Algicide®.

These products must be used strictly in accordance with their label directions. Other products, such as copper sulfate, should **not** be used in dams because of their environmental toxicity.



◆ Changes to FarmBIS Funding

- In NSW the subsidy has been reduced from 75% to 50% for all costs associated with training activities except to specific target groups.
- FarmBIS subsidies have also been withdrawn for Quality Assurance and Chemical User training activities.

For more information contact FarmBIS on 1800 678 593.



Crop Regulation of Stone Fruit - more than just thinning!

Roy Menzies, Research Horticulturist, NSW Agriculture, Bathurst.

Returns from stone fruit production, with a few exceptions are struggling to keep pace with the costs of production. One way to partly address this inequity is to re-look at crop regulation as a whole orchard marketing exercise, not just fruit thinning. The following flow chart highlights some of the decisions and actions throughout the season.

Please note that the whole system depends on a good communication with the markets to produce what is required. (Roadside selling does provide a few growers with other options for “less marketable” fruit).

Winter

Check market requirements for fruit size

- export markets
- local markets
- market reports and personal contracts



Assess potential crop loads for all blocks

- butt size
- canopy size
- tree age
- cropping history



Prune to provide an appropriate number of laterals/fruitlets

- base on crop load potential
- count laterals



Spring

Hand thin at blossom or after shuck fall

- count fruit on typical trees



Use chemical thinners selectively

- test initially
- always leave unsprayed trees
- prioritise blocks and varieties
- record weather conditions



Summer



Control excessive leaf and shoot growth

- Cultar ®
- pruning
- Regulated Deficient Irrigation (RDI)
- fertiliser strategies



Record harvest returns

- observation trees
- individual varieties
- size premiums



Autumn

“Post mortem” review of the season

- modify the program for next season
- check the markets again

Is it practical?

The obvious answer is yes, but for a busy orchardist who is trying to cope with a wide range of responsibilities including being a horticulturist, accountant, engineer and business manager some convincing is needed.

Record keeping is an increasing burden in the orchard but the records needed for crop regulation are practical, often already part of other management plans and provide a detailed understanding of the orchard.

There are some potential weak links:

1. We can accurately determine and predict harvest sizes, but can the hired staff carry this out?
2. There are no guarantees in the face of natural disasters such as drought, frost etc.
3. Generally market preferences will remain similar throughout the season but there remains the perennial experience that markets usually want what we have least of.

Thinning – has the concept changed?

Apart from the detailed measurement for different varieties, ages and tree size and the potential use of chemical thinners, the basics of thinning remain the same. Placement, distribution, fruiting habits, timing etc always have been and will continue to be important.

Removing the unwanted fruit

This has always been a tedious and labour intensive job. It is impossible to thin all trees at the optimum time. It

can cost from \$3 to \$6 per tree depending on size and crop and the accuracy is dependent on the competence and enthusiasm of the labour. We can not eliminate hand thinning but we can make it more efficient. How?

- Growing trees that can be reached from the ground.
- Pruning carefully to provide an accurate number of “production units”.
- Using one or both of the available chemical thinners.

Are chemicals the answer?

At the risk of having an “each way bet” the answer is yes and no. There will always be the need to hand thin. The chemical thinners only reduce the fruit load by 60 to 80% of optimum and save a major portion of the time, labour and money involved in hand thinning. The rules for chemical thinners are:

- Try them on a small scale
- Keep good records
- Leave untreated trees
- Use experience to improve next season’s results.

In the next issue of this newsletter we will investigate in more detail the different methods for determining the crop or fruit load and methods to predict fruit size at harvest as well as some alternative management techniques.

The crop regulation of stone fruit project was funded by HAL, ASFGA, NSW Agriculture and QDPI.

The following list briefly summarises the chemical thinners available to growers.

	Culminate [®] /Armothin [®]	Ralex [®]
Timing	Critical - small window around full bloom	More flexible - flower bud initiation (FBI) - needs refining
Over-spraying	Risk is higher with no foliage	Lower risk
Uniformity	Depends on an even flowering. More difficult in warmer districts	Theoretically more even. Stage of development can vary within the tree and along the lateral
Costs per hectare (based on average recommendations)	\$140 per hectare (based on 15 L/ha)	\$325 per hectare (based on 2.5 L/ha)



Helping Farmers Look After the Environment

Rebecca Lines-Kelly, NSW Agriculture

Part of a Paper presented at the 2002 conference of the Australian Association for Environmental Education Griffith University, Queensland, 2-6 July 2002.

Introduction

In NSW, 117,000 people are employed in agriculture and related services, out of a total population of 6.4 million. They manage 75% of NSW's land mass and face increasing pressure to manage it for environmental health as well as make a living. They face a plethora of environmental issues that affect their ability to use the land productively. These issues include salinity and rising watertables, poor water quality, land clearing leading to loss of habitat and biodiversity, use of chemicals resulting in residues and water quality problems, weeds, soil structure decline, soil erosion, acid sulfate soils, acid soils, and loss of soil fertility.

The threats these environmental issues pose to agricultural productivity and land values mean that farmers are probably more motivated than any other group of people in Australia to change their practices to improve the environment. The scale and extent of change required to improve the environment and maintain agricultural productivity in rural areas have pushed environmental education and training to the fore in agriculture. Much of the work being done in this area is cutting edge in terms of achieving practice change and social change, and in adapting and refining adult and lifelong learning techniques.

In 2000 the NSW Environmental Education Council undertook an inventory of environmental education in which NSW Agriculture was found to be a very large provider of both formal and informal environmental education through its agricultural colleges and front-line advisory services.

This paper outlines some of the work being done by NSW Agriculture with farmers.

Environmental Extension Programs

◆ Water management

As the major user of freshwater resources, irrigated agriculture has had a detrimental impact on inland waters through changed flows, eutrophication, turbidity and salinity. As well, the state's water resources are fully, if not over, committed, so regional water committees have been developing water sharing plans to help allocate this limited resource between humans, animals, crops and the environment. NSW Agriculture representatives have assisted these committees understand

the impacts their decisions might have on the irrigation industry, farmers and rural communities.

There are two major programs to help farmers with water management and improve the health of our waterways: Waterwise on the Farm, and the Water use efficiency unit.

Waterwise on the Farm provides training to farmers to help them improve their irrigation management and techniques, and benchmarks farmers' agricultural water use and irrigation productivity. Already, more than 2000 farmers have undertaken irrigation management training, and these new skills, together with water efficient technologies, are leading to major savings in water use. For example, a Hunter Valley vineyard manager has demonstrated the potential to reduce water use from 3 ML/ha to 1.5 ML/ha.

The water use efficiency advisory unit, based at Dubbo, is a joint initiative of NSW Agriculture and the Department of Land and Water Conservation. It provides information and advice to irrigators on water use efficiency and water access licensing.

For more information on the department's water management programs see the webpage: <http://www.agric.nsw.gov.au/reader/11139>.

◆ Farm forestry

In 2000 we established a farm forestry unit at Tamworth to encourage farmers to integrate tree crops into agriculture. Potential production benefits include:

- sale of timber and other products
- shade and shelter, additional fodder, lowered water tables reducing salinity, reduced wind speed and evaporation and fewer pests by maintaining beneficial predators.
- returns from marginal areas like laneways, riparian areas, steep areas and areas with soil erosion, or problem soils.
- buffers between neighbours and intensive agriculture able to be carried out with less conflict.
- use of effluent from intensive livestock enterprises.

Tree crops are more flexible in the timing of work, using farm resources more effectively throughout the year. Trees help maintain biodiversity and provide wildlife corridors. They also have aesthetic value, increasing property value and providing a more pleasant place to live and work.

For more information about farm forestry see the webpage: <http://www.agric.nsw.gov.au/reader/2291>.

◆ **Soil management**

Helping farmers manage their soils has been a departmental priority for decades. Currently there are several soil extension programs running and this is an expanding area for education and training in agriculture. In recent years there has been increasing interest in the concept of soil health, which considers the three aspects of soil's chemistry, biology and physical structure, rather than looking at each one separately. By managing for soil health, farmers enable soils to recover from agricultural disturbance without being degraded. Currently the department is working with a north coast landcare group investigating soil health in horticulture, and the success of this program is encouraging soil scientists in other areas of the state to help farmers work with soils at a holistic level. One of the most useful outputs is a soil health card designed to help farmers self-assess their soil health and work out appropriate management strategies.

◆ **Soil acidity**

Once soils become acid it is very difficult to get them back to neutral pH, so it is important not to let them acidify, when they become much less productive, and more vulnerable to drought, loss of groundcover and erosion. NSW has 13.7 million ha of agricultural land seriously affected by acidic soils, with another 5.7 million ha at risk. The cost of soil acidity in lost agricultural production is estimated to be between \$90 and \$225 million a year. Since 1997 NSW Agriculture has run the Acid Soil Action program to try and ameliorate soil acidity. The program

- funds research into management of acid soils,
- runs soil testing workshops to encourage farmers to test their soil and use lime,
- has developed a landscape management course to help farmers integrate landscape, soil and plant issues,
- funds projects to reduce acid water discharge,
- funds rehabilitation projects for acid sulfate soil hot spots.

ASA funds several community group projects where landholders investigate pasture and animal responses to top-dressed lime. These are co-learning sites that serve as a focus for learning and extending research results from other long running research sites.

For more information on acid soils and Acid Soil Action, see the webpage: <http://www.agric.nsw.gov.au/reader/3676>.

◆ **Acid sulfate soils**

Acid sulfate soils are caused by the oxidation of coastal muds that contain iron pyrite. When exposed to air the pyrite produces sulfuric acid and iron and these have

severe impacts on soil and water quality, as well as plant and animal life. NSW Agriculture has two project officers who work with floodplain landholders to develop management practices that do not acidify soil or water. The department is also closely involved with the Clarence Floodplain Project, a landmark project where landholders, fishers, and government agencies work together to devise practical solutions to improve water quality draining off agricultural land for fish habitat. The project has greatly improved linkages between the different communities on the floodplain, and improved their skills and understanding of ecosystem processes.

For more information on acid sulfate soils, see the webpage: <http://www.agric.nsw.gov.au/reader/8632>

◆ **Structural degradation**

The breaking down of soil structure through cultivation, compaction and lack of organic matter, is estimated to cost \$145 million annually in lost production in the Murray Darling Basin alone.

NSW Agriculture has worked closely with farmers to develop techniques to reduce structural degradation, including:

- Conservation tillage where the soil is not cultivated.
- Crop-pasture rotations.
- More suitable tillage machinery.
- Precision agriculture systems.
- The use of machinery tracks on cropping soils so that only a small area of the paddock is compacted.
- The return of organic matter to the soil.

The department has produced several SOILpak advisory guides to help farmers minimise and improve soil structure. You can access the SOILpaks at the webpage <http://www.agric.nsw.gov.au/reader/12935>.

◆ **Weed management**

NSW Agriculture has a weed biological control unit which investigates natural predators of weeds and works with farmers to release them and reduce reliance on farm chemicals. It has a major investment in the CRC for Weed Management that seeks to benefit agricultural production and the conservation of the State's natural resources.

For more information on the department's weed management strategies, see the webpage: <http://www.agric.nsw.gov.au/reader/1877>.

◆ **Farm chemical management**

The department offers courses in application and management of farm chemicals, run in conjunction with TAFE. Course information covers transport, handling, decontamination of equipment and disposal of used containers. Participants learn how to use chemicals in boom sprays, air blast sprayers and animal spray units.

For more information on farm chemicals, see the webpages: <http://www.agric.nsw.gov.au/reader/2114> and <http://www.lg.tafensw.edu.au/smarttrain/default.htm>.

◆ **Climate risk management**

Since 1990, the earth has warmed by about 0.6 degrees. Careful examination of Australian climate data shows that there has been a steady overall rise in temperature (0.7 degrees), especially in the latter half of the 20th century. Agriculture is viewed as both a source of greenhouse gases (estimated to contribute 15% of Australia's potential warming) and an important sink for managing greenhouse gas emissions. NSW Agriculture has a role in negotiating and promoting appropriate practices to manage the greenhouse gas problem. The department's activities include:

- Establishing a climate risk management unit at Tamworth.
- Promoting practices that conserve or build soil carbon along with reduced clearing and reforestation.
- Promoting high quality pasture as this will lead to less methane per kg of meat and wool.
- Familiarising industries with scenarios for climate change along with the appropriate uncertainties.
- Working with agricultural industries to develop farming systems that better manage climate variability.

For more information about the department's activities in managing climate risk, see the webpage: <http://www.agric.nsw.gov.au/reader/1212>.

◆ **Organic farming**

The organic farming industry in Australia is said to be expanding at between 16 and 25 percent a year and is currently estimated to be worth around \$250 million a year at the retail level. This is a significant segment of production and one that requires investigation and development of new technologies, to help maintain its progress. NSW Agriculture has employed an organic farming officer for the past 15 years, has an organic farming demonstration at Yanco College, and last year opened its centre for organic farming at Bathurst where we offer advice and undertake research. Together with the network of research, advisory, education and regulatory specialists located across the State, the organic team will place a significantly sharper focus on organic and biodynamic food and fibre production across NSW.

For more information on the department's work in organics, see the webpage: <http://www.agric.nsw.gov.au/reader/4858>.

◆ **Environmental management systems**

An environmental management system (EMS) is a

systematic approach to managing the impacts that an enterprise or business has on the environment. It concentrates on the management process itself, rather than achieving a specific set of environmental outcomes. NSW Agriculture, through its Environmental Centre of Excellence at Wollongbar, is the leading agency nationally in the use of EMS for agriculture and has received strong funding support from the Rural Industries Research and Development Corporation. Leading by example, the Department is establishing environmental management systems on all its major research stations. The department has helped two grain farmers progress through the EMS process and gain certification against ISO14001 Department with funding support from the GRDC and Land and Water Australia. Tocal Agricultural College has developed an introductory course on EMS for farmers and is proceeding to have the course accredited under the national training framework.

Farm businesses with EMS accreditation may:

- attract a product market advantage through product differentiation and proven 'clean, green' image (eco-labelling),
- enjoy more streamlined development approval under the EP&A Act, Native Vegetation Conservation Act, the Threatened Species Conservation Act and the Plantations and Reafforestation Act,
- reduce the risk of undesirable offsite impacts of farm business operations and any consequent litigation,
- improve the image of farm businesses,
- contribute to an increase in land value or lending surety by more accurately describing the status, value and management of the farm business's natural resources.

For more information on environmental management systems in agriculture, see the webpage: [http:// !\[\]\(cebdf28220713f21f1ebb8bbb41971b3_img.jpg\) www.agric.nsw.gov.au/reader/11441](http://www.agric.nsw.gov.au/reader/11441).

Publications

- ◆ The third edition of the **National Standard for Organic and Biodynamic Produce** was released in September 2002. The full document can be downloaded from the AQIS website at www.aqis.gov.au/organic. (70 pages)

- ◆ **Spray Drift Management: Principles, Strategies & Supporting Information.**

Produced by Primary Industries Standing committee 2002. (71 pages). For copies phone CSIRO 1800 645 051.

What's on

The Golden Circle Australian Citrus Growers 55th Annual Conference



*A future
for
your citrus
in a changing
globalised market*

Leeton NSW 6-10 April 2003

Organisers of the Golden Circle Australian Citrus Growers 55th Annual Conference are on track to present a truly world class event following confirmation by all nine invited guest speakers.

The Conference will be held at Leeton NSW 6-10 April. The theme is "A future for your citrus in a changing globalised market". An outstanding range of speakers from Australia, Spain, South Africa and Thailand will make presentations during the Conference.

Spokesperson for the Organising Committee Peter Davidson said the Leeton growers had established a Conference theme and format that would challenge and inform Australia's citrus growers. "The Committee gathered input from a wide range of people within the industry and across the global trade, marketing and supply chain. We identified the important issues that needed to be addressed and the key individuals we considered to be at the coalface of trade, global procurement, marketing, innovation, citrus quality management and achievement in business. This would offer growers from throughout Australia access to the very latest information to help them compete in changing global markets."

◆ Irrigation Conference 2003 Dubbo Showground, May 7th & 8th 2003

Irrigation 2003, the annual conference of the Irrigation Association of Australia, is coming to Dubbo with something for everyone involved in the irrigation industry.

Two of the highest profile individuals in the water debate today, Richard Pratt from Visy Industries and Don Blackmore from the Murray-Darling Basin Commission, will provide their insights into what the future might hold and how the industry can not only survive the drought but also develop a sustainable and viable future.

Specialist speakers will discuss practical options for maintaining and growing profitability in the face of reduced water access. This will be followed by practical demonstrations of products and service aimed at helping

irrigators improve their profitability and sustainability by either producing more with the water they have or by using less water to maintain their current productivity. Both will be complimented by a trade display of all the best and brightest products and services from local and interstate suppliers. Exciting sponsorship and trade display opportunities exist.

Aware of the severe impact of the drought, registration is just \$308 for members and \$352 for non members. Day registration is available.

For more information contact:

Jolyon Burnett, CEO, Phone: 02 9476 0142

For bookings contact: Michelle Halsey

Phone: 02 9476 0142

◆ Update 2003 - National Low Chill Stonefruit Industry Conference & Trade Expo: 20-21st May 2003, Ballina

We are pleased to advise that internationally respected tree crop scientist Professor Amnon Erez, from the Institute of Horticulture, Volcani Centre in Israel, will present two papers to the forthcoming Conference to be held at the Ballina RSL Convention Centre. Sessions at the Conference include:

Tuesday 20th:

- Low Chill Stonefruit – the global challenges
- Varietal Development Issues
- Healthy Soil & Tree Nutrition – the Alternatives
- Canopy management to produce sweeter fruit

Wednesday 21st:

- State of the Nation
- Regulatory Compliance – Conditions Apply
- Understanding the Market Chain
- Strategies for improving grower profitability, and bridging the consumer expectation gap

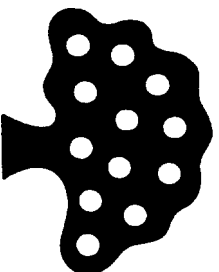
For Conference registration phone Phillip Wilk on (02) 6626-2450.

◆ 19th June 2003, Renmark New Citrus Varieties Field Day

◆ 10-13th September 2003 AUF National Horticultural Industry Conference Homebush, Sydney. Theme "Made in Australia"

For more information phone AUF on 02 9763 1767 or Conference Organizers on 07 3254 0522.


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COASTAL FRUITGROWERS' NEWSLETTER

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.

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ALWAYS READ THE LABEL

Users of agricultural chemical products must always read the label and any Permit, before using the product, and strictly comply with the directions on the label and the conditions of any Permit. Users are not absolved from compliance with the directions on the label or the conditions of the Permit by reason of any statement made or omitted to be made in this publication.

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