

# Talking Avocados



The Australian Newsline

SPRING 2002 ISSUE

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Sponsored by AAGF and HAL

# My Comment



Welcome to the 2002 Spring Issue of Talking Avocados. The fifth publication I have produced and edited for the Australian Avocado Growers' Federation - how time flies! I was requested by Rob Donkin to hold this publication back till after the Levy Payers' Meeting in South Australia for coverage and reporting of that event - hence its October publication rather than September.

This issue records Rob Donkin's resignation (for personal reasons) as your Industry Manager and his replacement with Antony Allen. I would like to record my appreciation to Rob for his assistance and support in producing your industry publication and wish him and his family well for the future.

It is not an easy task running an industry organization - dealing with the day-to-day affairs as well as progressing issues along, often with little back up staff. Rob came into a difficult job with a void following the departure of the previous Industry Manager and the Australian and New Zealand Avocado Conference bearing down on him. It can't have been easy but he pulled it off. Having been through the same mill, I have some understanding of the stress that sometimes seems insurmountable. One must look to the positives and move on and I trust Rob will see his time with AAGF in that light.

Rob's departure brings to mind how rapidly the faces in Australia's horticultural industry have changed over the last eighteen months or so. Coming to mind firstly is Bob Granger now your IAC Independent Chairman. Bob, the former General Manager of Queensland Fruit & Vegetable Growers, has recently been appointed Chairman of the Sugar Research and Development Corporation. His replacement at QFVG, Jan Davis, has given the place a complete makeover to meet the challenges that lie ahead when their state statutory levy comes to a close next year.

AUSVEG has a new Chairman in Michael Badcock, replacing retiring Silvio Favaro, and will shortly have a new CEO to replace well known industry identity Brian Newman - a founder (I believe) of that organization.

Ross Boyle has moved from being CEO of the Australian Banana Growers' Council to the top job with Bananas NSW (formally the Banana Industry Committee). Also, long time EO Judi Prosser has moved on (earlier this year) from the Australian Onion Industry Association. And Peter McFarlane is no longer the CEO of the Australian Fresh Stone Fruit Growers' Association. Renamed Summerfruit Australia he has moved on with a replacement in Greg McPhee as the new Industry Development Manager.

The Australian Apple and Pear Growers' Association has become Apple and Pear Australia Limited and not forgetting AHC & HRDC becoming the new service company HAL. With all these changes could AAGF become Avocados Australia?

I guess I've been part of all these changes taking on the production and editing of Talking Avocados from long-time editor Orf Bartrop and not to mention the position of National Executive Officer of the Australian United Fresh Fruit & Vegetable Association or AUF. We're not thinking of changing our name though we do now tend to call ourselves Australian United Fresh.

What's in a name? Well not much really but the end results. All one can and should expect is that your industry body, and those who manage its functions perform and produce results for the betterment of those who undertake to make that industry their own. Congratulations Antony on your appointment. I look forward to working with you and AAGF for the betterment of the Avocado Industry.

*Col Scotney - Editor*

# TALKING AVOCADOS

*Talking Avocados* is the official publication of the Australian Avocado Growers' Federation and published in conjunction with Horticulture Australia Ltd.

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**We all make mistakes:** If we make a mistake please let us know so a correction may be made in the next issue.

**Cover:** Sydney Markets Wholesaler Albert Petulla of A&H Fruit Supply. A&H Fruit Supply with Albert and Leo Ruello in the foreground were recently included in a publication on Sydney by well known photographer Ken Duncan. Albert and Frank Petulla are noted for their quality produce.

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## New Readers Welcome

*Talking Avocados welcomes the following new readers -*  
**Queensland grower -**

Yeolean Haase - Gin Gin Seedlings, Gin Gin

**New South Wales grower -**

Phillip McArthur - Grassy Head

**Western Australian growers -**

Harry & Margaret Poole - Albany

Marcus & Pat Wood - Albany

Tom & Jocelyn Wilkinson - Albany

Kylie Shepard - Albany

Peter & Ron Cocking - Denmark

Sandy Lyon Willyung Farms - Albany

*Please feel free to participate in your industry publication.*

*Your comments and 'Letters to the Editor' are very welcome. Ed.*



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## PRESIDENT'S PERSPECTIVE



The AAGF is pleased to advise that Antony Allen has commenced duties as Industry Manager based in Brisbane. Antony joins the AAGF from a background in horticulture at both an academic and business level. An important aspect of the role of Industry Manager is communication and Antony will be progressing a number of initiatives in this area in the coming months. Antony will introduce himself elsewhere in this issue.

Rob Donkin who many of you met over the last two years as he visited the regions and at the Bundaberg conference, resigned from the position as Industry Manager for personal reasons and has returned to Townsville.

The Avocado Industry Advisory Committee (IAC) held its first levy payers meeting recently in the Riverland (SA). These meetings are an important component of the accountability to the growers for the management and expenditure of the marketing and R&D levies which we all pay, by the IAC, the AAGF and Horticulture Australia Ltd (HAL).

The meeting was programmed with the biannual AAGF Board meeting and the AGM of the AAGF. The presentations and discussions were, I believe, very informative and it was disappointing to see the limited number of local growers present.

The supply/demand situation continues to be satisfactory for most growers with wholesale prices at acceptable levels. Fruit is apparently moving through the marketing chain without undue delay, so quality at retail level appears to be assisting demand.

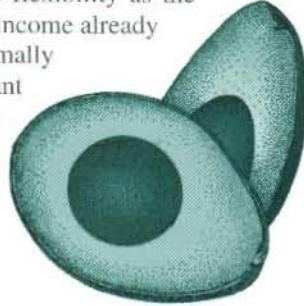
The New Zealand industry expects a similar total crop to last year so provided they have no major problems with their USA exports, they plan to send less fruit to Australia than they did last year.

The submission seeking access to USA for Australian avocados, which the AAGF and Biosecurity prepared, has been forwarded to the USA. We do not expect an immediate response but will be maintaining contact with the appropriate authorities to ensure the submission is progressed with minimal delay.

The continuing dry weather in many of our production regions is causing many of you serious concern. I can assure you it also causes concern at industry management level as we attempt to budget and plan marketing and R&D programmes.

The marketing programme needs to have flexibility to allow for variations in crop size and also levy income as expenditure is normally made in the year the income is received. The R&D programme does have a little more flexibility as the programme is planned based on the income already received. However projects are normally over three years so there are significant ongoing commitments. I look forward to all regions returning to "normal" weather conditions this summer so that it will be a little easier for us all. We can but hope.

*Rod Dalton - President*



# FROM YOUR FEDERATION

Welcome to my first "From Your Federation" report, as your new Industry Manager. I am pleased to be given the opportunity to work for your industry and look forward to progressing the AAGF in the years to come.

My background is in horticulture. I attended the University of Western Sydney – Hawkesbury (Hawkesbury Agricultural College), and have worked in a number of sections of horticulture including the citrus and stone fruit industries in management, marketing, in the orchard and within research projects.

On a practical level I have co-ordinated picking to packinghouse, through to the market of over \$13 million fruit during a season, \$7 million of which was exported fruit going to Asia and the Middle East. I have developed from bare paddock to production a state-of-the-art 24 hour, 365 days per year scion budwood production facility, allowing the rapid multiplication of new varieties of tree crops.

Some of the research projects have included developing molecular markers for breeding and evaluation and postharvest storage trials for export fruit. Most recently I have been working in the areas of varietal licensing and marketing systems. My aim is to assist in providing an efficient and informed AAGF and to maximise that benefit for the grower.

## **Remark Report...**

As one of the very first duties for the AAGF, I have just returned from a combined Board of Directors meeting, AGM of the AAGF and the first Levy Payers meeting of the Avocado Industry Advisory Committee (IAC) - all held in Renmark, South Australia from 23 to 25 September. This was a great opportunity to meet with all Board members and local growers as well as getting to know the region's avocado orchards and packinghouses. South Australia is in the middle of an excellent crop, both in terms of volume and quality.

The Board remains unchanged from last year with Rod Dalton continuing as President, Russel Proudfoot continuing as Vice President and Henry Kwaczynski being elected to the position of Treasurer. The membership of the various committees stands as;

### **VARIETIES COMMITTEE -**

Rod Dalton (Chairman), Allan Ross, Peter Young (Nurseryman), Graham Anderson (Nurseryman), Tony Whiley (Technical Advisor), Ken Pegg (Technical Advisor), Registrar: Antony Allen (Industry Manager), with Graeme Thomas and Chris Searle to be invited to become committee members.

### **MARKETING COMMITTEE -**

Colin Fechner (Chairman), Ron Simpson, Gary Poole, Graham Chartres, Rob Robson, AAGF President, Wayne Prowse (HAL), Antony Allen (Industry Manager).

### **R, D & E COMMITTEE**

Russell Proudfoot (Chairman), George Green, Graeme Thomas, John Dorrian, David Peasley, Alan Blight, John Tyas (HAL), Antony Allen (Industry Manager) with Tony Whiley to be invited to become a committee member.

## **DIRECTORS' PORTFOLIOS**

**Export** - Henry Kwaczynski

**International Linkages** - Henry Kwaczynski

**Statistics/Industry Data** - Peter Molenaar

**Communications** - Chris Nelson, Alan Ross

**Marketing** - Colin Fechner

**Research & Development** - Russell Proudfoot, Wayne Franceschi

**Supply Chain** - Wayne Franceschi

**Industry Levies** - Ian Tolson, Colin Cummings

## **Horticulture Australia...**

Wayne Prowse and John Tyas from Horticulture Australia made presentations to both the Board and Levy Payers Meetings, giving a complete outline of the marketing and R & D programs to date and directions for the next 12 months.

The highlights were, from the marketing program –

- the TV advertising campaign for Australian avocados, a first for our industry, and a campaign that will continue for the next 12 months, and from the R & D program
- the "Best Export Prospects" report that provides a base of reliable information with which to approach the developing of export markets for Australian avocados.

In this issue you will receive a copy of the 2001-2002 Avocado Industry Report that includes a summary of completed major projects and an investment summary for the Australian avocado industry.

If you would like a complete copy of any of the R & D final reports please contact Horticulture Australia on 02 8295 2300 and they will be happy to forward it to you direct.

## **World Avocado Congress...**

The World Avocado Congress from 19 to 24 October 2003 in Granada-Malaga Spain is getting closer and the organisers have announced their tentative timetable for the six days in October 2003. For further information and email updates go to

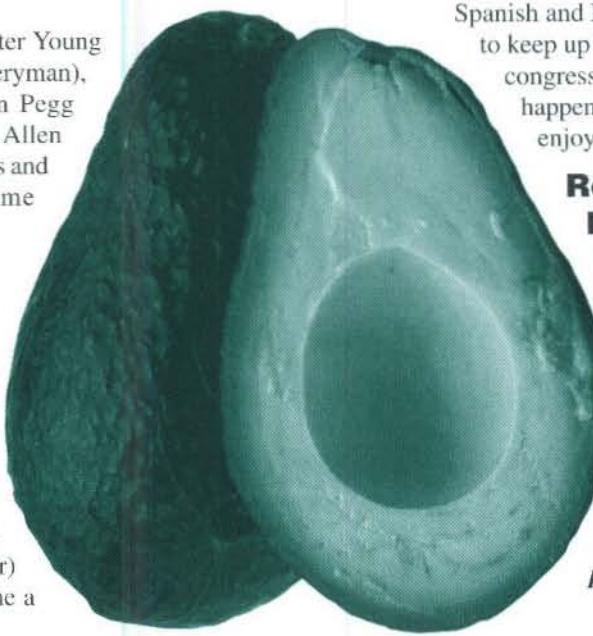
[www.congresomundialaguacate.org](http://www.congresomundialaguacate.org). This site has both

Spanish and English. It is the best and easiest way to keep up to date. I encourage you to attend the congress. You will gain knowledge of what is happening internationally in your industry and enjoy great Spanish hospitality.

## **Regional Research Extension...**

I look forward to meeting many of you over the coming year, with the initial planning beginning for a regional road show that will be tailored to each of the avocado growing regions, bringing the researchers to you and into your orchards. This will give you the opportunity to see first hand how the R & D projects are applicable to you.

*By Antony Allen – Industry Manager*



# New South Wales Avocado Association members' STUDY TOUR

Farm Training Alliances in conjunction with AgTours Australia present the following Study Tour of the South Australian Avocado Industry for members of the NSW Avocado Association Inc. The price for FARBIZ eligible participants is \$385.00. This includes airfares (Sydney to Adelaide return), 5 breakfasts, 4 lunches and 3 dinners. Numbers are limited. For further information contact Alison Tolson - Ph: 02 6569 0872, Email: [tolson@midcoast.com.au](mailto:tolson@midcoast.com.au).

## Itinerary...

<b>Day 1</b> (---)	<b>ARRIVE WAIKERIE</b> Gather at Sydney airport (connecting flights as required from Coolangatta, Lismore, Coffs Harbour and Newcastle as required) for midday flight to Adelaide. On arrival you are met by your AgTour tour manager and assisted to board your coach. Travelling to Waikerie you will pass through Adelaide's northern suburbs, the satellite city of Elizabeth and the Barossa Valley vineyards. After crossing the Murray at Blanchetown, you pass through recently-established sprinkler-irrigation developments before reaching Waikerie and checking into your hotel for two nights. The remainder of the evening is free.	Saturday 5 <sup>th</sup> April 2003 <b>WAIKERIE HOTEL MOTEL</b>
<b>Day 2</b> (B L -)	<b>From WAIKERIE</b> Study program commences with two orchard visits and an investigation of the local salt interception scheme and its associated holding ponds. Later in the day, a panel of local growers will answer questions on avocado production in the Riverland.	Sunday 6 <sup>th</sup> April 2003 <b>WAIKERIE HOTEL MOTEL</b>
<b>Day 3</b> (B L D)	<b>WAIKERIE to RENMARK</b> The day's program commences after breakfast with an orchard inspection, followed by a visit to a group of growers operating a private irrigation scheme based on a common pump and mainline from the Murray. Early afternoon you rejoin the coach for the short journey upriver to Renmark. On the way you pass through areas of intense horticultural production surrounding Kingston, Barmera, and Lyrup. At Berri you visit a spraying equipment manufacturer to study a system developed to apply pesticides and herbicides in horticultural crops at extremely low water rates. On arriving at Renmark you check in to your hotel before enjoying dinner during a riverboat cruise on the Murray.	Monday 7 <sup>th</sup> April 2003 <b>RENMARK HOTEL MOTEL</b>
<b>Day 4</b> (B L D)	<b>RENMARK to MILDURA</b> Two orchards are visited in the morning, followed by a packing house. Here you study leading-edge technology for grading fruit for size, weight and quality, as well as a variety of packing systems. In the early afternoon you travel to the Victorian city of Mildura, passing through extensive areas of new vineyard development at Lake Cullulleraine. On arrival at Mildura you visit a local winery to enjoy a guided tour of the facility and to taste their current wines. Later, after checking in to your hotel, you enjoy dinner at a winery.	Tuesday 8 <sup>th</sup> April 2003 <b>MILDURA GRAND HOTEL</b>
<b>Day 5</b> (B L -)	<b>MILDURA to ADELAIDE</b> This morning concludes your studies with two orchard visits and mid-morning you commence your journey back to Adelaide, pausing to enjoy a picnic lunch and admire the view from the bank of the Murray. Your route this afternoon takes you through the South Australian Mallee, with large areas of windblown sand broken by irrigated field crops using water pumped from bores. At Murray Bridge you rejoin the river briefly before continuing through the scenic Adelaide Hills and on to Adelaide. In the evening, you are free to explore the "City of Wine & Roses" and dine in the restaurant of your choice.	Wednesday 9 <sup>th</sup> April 2003 <b>FESTIVAL LODGE MOTEL</b>
<b>Day 6</b> (B - -)	<b>ADELAIDE departure</b> Time at leisure prior to being transferred to Adelaide Airport for your return flight to Sydney. Connections as required to northern ports.	Thursday 10 <sup>th</sup> April 2003



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# AUSTRALIAN ROUNDUP...



## NEW SOUTH WALES

In the north, growers have suffered production losses of up to 80% due to the unfavourable weather conditions earlier in the season. The 80-120mm of rainfall towards the end of August has been a welcome relief but further follow-up rain is needed. With the harvest due to finish in early October, and 'good flowering' for next season, hopefully growers can look forward to a better season in 2003 - weather permitting.

The Grafton to Stuarts Point area harvest began earlier than usual, with growers taking advantage of rather favourable prices. Production for some growers was down on previous years, others experienced smaller fruit than usual, while some crops have exceeded production expectations.

Prices have remained above average throughout the season and the harvest is due to finish within the next few weeks. Most growers report 'good flowering' for next season.

The Comboyne area harvest has just started. Fruit size and quality are good. Like the rest of the state though, conditions are dry.

Nelson's Bay/Mangrove Mountain area will begin their harvest a little later in the year, so it is hoped we can report on a good season for them in the next edition.

It was good to see so many growers taking advantage of the AVOMAN 'training sessions' held recently. From what we have seen, of the yet to be completed new version, it will be a very powerful management tool for growers.

At our AGM held in April, members voted unanimously to form a 'relationship' with NSW Farmers. It is hoped full details of the fee structure etc will be available for the next edition.

A study tour of the South Australian Avocado region is planned for next April. Details & an approximate price for the tour are outlined within this edition. Numbers are limited.

*Till next time! Chris Nelson*

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## SOUTH AUSTRALIA

We have had a very dry and cold winter with a lot of light frosts, which had most growers on their toes with irrigations and frost controls. There is still a large crop of Hass and Reed on the trees as we are about to start the harvest of Hass soon.

The Royal Adelaide Show has just finished and it was a successful one again. We sold/put into dips 310 trays of Hass as well as giving away in the Yellow Brick Showbag 18,500 small Hass. We had a willing band of helpers with no shortage of growers willing to spend a day or two promoting avocados at the Show.

In the Horticultural Hall, in amongst all the flowers and fruit and vegetables, the Adelaide Fresh Promotions held cooking demonstrations every day featuring different fruit. It was well received with a lot of people stopping and watching as well as asking questions.

Thanks go to Kraft, Cerebos, and Smiths Snackfood for their donations of goods to help in the promotion of Avocados.

*By Colin Fechner*

## SUNSHINE COAST

September heralds the passing of another winter and the advent of a new spring. The rain experienced in late August was certainly needed, and very much appreciated in SE Queensland. Unfortunately it was not enough and we are now experiencing one of the worst periods of ongoing drought in the last 100 years.

The last very hot summer (December 01 – January 02) coupled with low rainfall during 2001, saw the production of avocados in this region decline dramatically. Avocado growers are now anticipating perhaps a better season in the 2003 year ahead. However, low rainfall and the current drought may yet play havoc with next year's production.

An issue facing growers is the Queensland Government's decision to audit 250 packing sheds on the aspect of health and work safety.

This decision may have impact on some operations, as it appears that some elements of the audit may be quite invasive and directive. I would encourage everyone in Queensland to make exploratory approaches to Farm Safety or a similar organisation, in an endeavour to be appropriately prepared in case you should be the one to have your establishment audited.

Sunshine Coast Avocado Growers' Association (SCAGA) is planning to organise workshops to cover this. Don't forget that you may be able to obtain subsidies for these workshops.

Recently I attended a National On-Farm Food Safety and Quality Conference in Hobart. In the next issue of TA, I shall report on this diverse and somewhat mysterious event – did you know that there are over 400 QA schemes operating in Australia right now?

*By Henry Kwaczynski*

## WEST MORETON

Mother Nature continues to test avocado growers in this region, as in most other production areas. Severe drought conditions continue with available water supplies becoming a serious concern for most.

The dry atmosphere increased the severity of the cold winter with a number of growers in the Lockyer Valley being affected by severe frosts in early July. On a number of orchards the total crop was affected and where the fruit could not be harvested within the week following the frost, significant losses were experienced. Total defoliation was observed in some orchards with consequently no flowering for the 2003 crop. Significant losses of young trees were also suffered.

Most orchards along the range from Toowoomba to Blackbutt escaped the worst of the cold and are currently harvesting a good crop. Early indications are that the crop for 2003 will be down in volume and if the dry weather continues, fruit size will also be affected.

By Rod Dalton

## ATHERTON TABLELANDS

The season is over and growers are moving into "The Care and Maintenance" phase and, in some cases, planting significant numbers of trees.

Total production for the Tablelands is slightly down on last year's crop, with 947000 trays being transported to southern markets. The variance from my original estimates of over 1,000,000 trays for 2002 reflects the drier and hot periods leading up to Christmas 2001.

I'm optimistic that the season for 2003 should see us break the 1,000,000 tray barrier with the increase being predominately in the Shepard/Green skins type.

A meeting in Mareeba with Senator Ron Boswell promoted the push for the horticultural industries such as ours, to be more active in seeking and using funding available from the Sustainable Regions Program.

A trial shipment of Hass has been airfreighted to Hong Kong to evaluate the potential of the Tablelands area's ability to service this growing market in South East Asia.

In a growth industry, you would think that the players, ie; growers, would take an active part in the management and direction of their peak body, but no, typically where there is a need to appoint a new executive team ie at an AGM, the growers stay away in droves. Perhaps this reflects that our industry is in good shape or, is it apathy. Is it that our growers are all up to speed in the Workplace Health & Safety, Workplace Industrial Relations, Networking for best practices, etc. I think not.

What is it going to take to get a united grower group - a year of poor prices, oversupply of produce, too many growers, because of the demise of the tobacco and Sugar Industry!!

Growers, the association needs your support now to ensure our future; get behind the new executives appointed on the 4<sup>th</sup> September.

*Your new team is -*

**Merrilyn Land - President (re-appointed)**

**Sue Christensen - Secretary**

**Adrian Zugno - Treasurer**

*Committee Members*

**Craig Feher**

**Rob McGregor**

**Scott Grimshaw**

By Col Cummings

## MOUNT TAMBORINE

Mt Tamborine has had a reasonable crop this year with picking nearing completion. Fruit quality for orchards that had sufficient water was excellent but spotting bug damage was significant this year. We are hoping present returns can be maintained next year.

By Allan Ross

## To Present Your Produce Attractively

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# Avocado IAC Annual Levy Payers' Meeting

**Yandilla Park, Renmark SA, Tuesday September 24 2002**

Achieving more market driven outcomes for levies is one of the main aims of the avocado industry's \$1.65m investment programme in research and market development.

This was one of the principal messages delivered at the Avocado Industry Advisory Committee's inaugural Annual Levy Payers' Meeting held in Renmark SA on 24 September at which some 25 producers including IAC members and HAL staff were in attendance.

The Independent Chairman Bob Granger said, "The *Annual Levy Payers Meeting* is a key accountability requirement for the avocado industry under the new arrangements for Horticulture Australia Limited (HAL) where the IAC must deliver to growers statements dealing with the industry." These are:

- Strategic investment plan (5 year);
- Annual investment plan; and
- Annual report to industry (for levies expended).

Bob Granger lead the meeting proceedings with a background statement on the Avocado Industry Strategic Plan with Wayne Prowse and John Tyas of HAL presenting the investment reports for R&D and market development for both 2001/2002 and 2002/2003. Details of the presentation slides are available from - Wayne Prowse of HAL Phone 02 8295 2300 or Email: [wayne.prowse@horticulture.com.au](mailto:wayne.prowse@horticulture.com.au).

For the 2002/2003-year, projects linked to the overall Strategic Investment Plan will cover:

- Continuing consultation and leadership by the peak body AAGF in respect to grower communications through Talking Avocados and the activities of the working committees for R&D and Marketing;
- Market promotion programmes in the main markets to increase consumption;
- Export market development;
- Project to improve quality and management practices through the supply chain; and
- R&D projects covering a range of key issues including root stock improvement and strategies for control of avocado diseases.

An Industry Report covering 2001/2002 was distributed to all persons at the meeting. The Report is contained within this issue of Talking Avocados.

Bob Granger said he was impressed by the extent and quality of grower queries at the meeting. "These canvassed a range of matters concerning research investments including issues covering evaluation of R&D programmes in terms of producing effective results, and market place impact of promotion programmes.

The linkages between investment projects and the needs of the industry as identified by the broad strategic investment plan is a critical determinant for the way grower levies were expended. Bob Granger forecast that there would be increasing pressure for both industry and research agencies to demonstrate positive market driven outcomes for levy investments.



*Bob Granger (L) with Antony Allen*



*Levy Payers Meeting*

## Letter to the Editor

Dear Editor,

Through your columns I would like to express an appreciation of Graeme Thomas. As an ordinary grower of avocados, the impact Graeme has had on my understanding is immense.

Graeme has decided to leave his leading role in Natures Fruit Company (NFC), "good on him". It is time for him to look after his own orchard and business for he has given more than enough of his voluntary time and personal cogitation to the avocado industry and, the Company in particular.

Having discovered the derisory remuneration for directors of NFC, he will find a few more dollars in his pocket now that he is not having to put so much effort into NFC.

There are few, if any, developments in the growing of avocados that Graeme has not had a large input into. He has been a circumspect researcher and latterly, an evangelist for the calcium and the root phosphorous acid stories.

Some poor soul will have to take on the organising of the avocado conference. I am confident that person will discover the "sweat and tears" Graeme suffered for the various conferences he was involved in.

A far sighted idea pursued by Graeme has been the association with the New Zealand avocado industry. Anyone looking at Talking Avocados Winter 2002 will see the vulnerability of our industry on a world basis. Graeme is effectively warning us of the trials of the sugar industry where the USA, EU and, somewhat unexpectedly, Thailand assist their sugar producers by a factor of 450%. One hopes our industry does not have to overcome such gross unfairness in world trade.

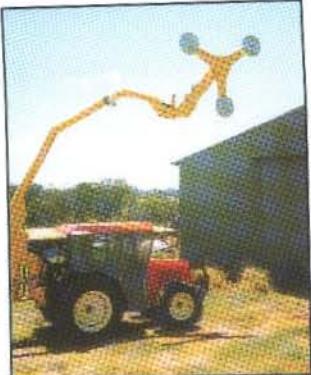
I only know Graeme through conferences, NFC and his many publishing efforts. These are the results of his work and give little indication of the thinking time, the anxiety, frustration and effort involved in getting the work done. Graeme is a diffident and self effacing fellow, so none of us really know how huge the debt is that we owe him.

Now a word to Graeme, "Don't stop, keep at it, we need ya".

**Frank Ekin, Grower**

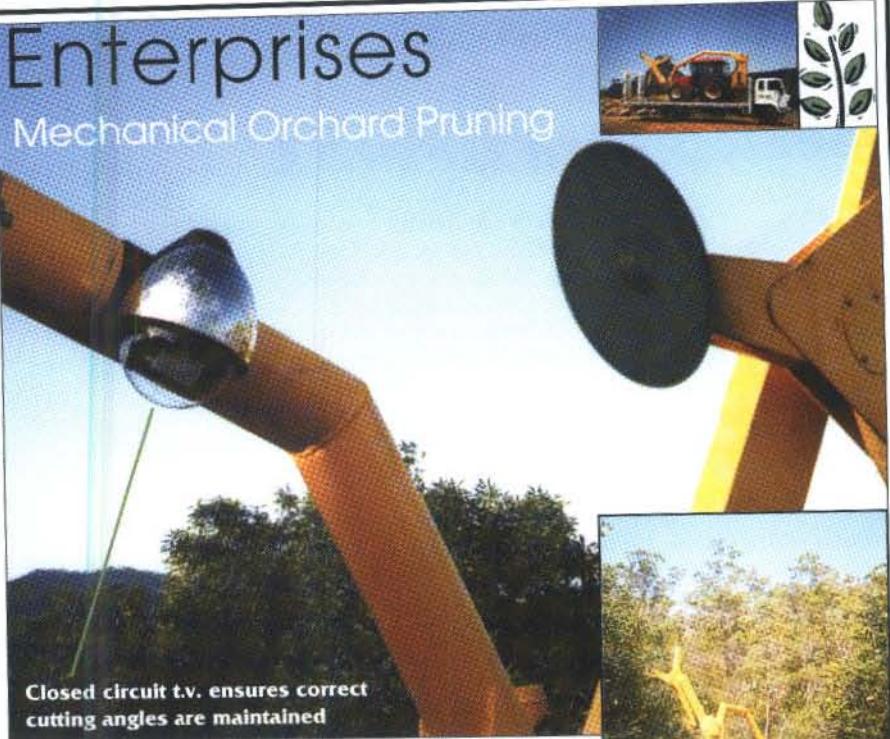
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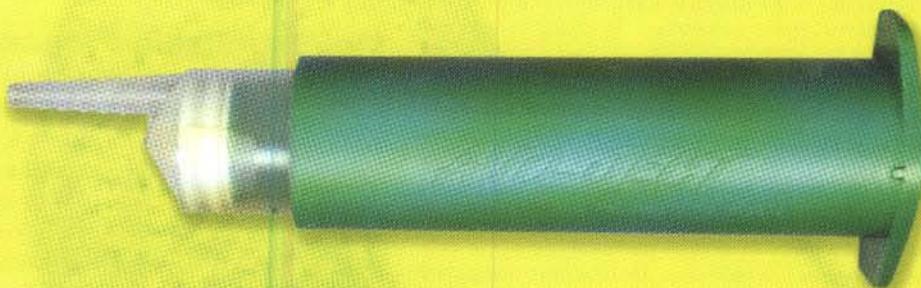


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## Horticulture Australia Limited - Research & Development UPDATE



John Tyas

Firstly I would like to introduce myself to those readers whom I have not yet met. I am a Program Manager with Horticulture Australia Limited (HAL) and have had responsibility for managing the avocado R&D program since October last year. This program was previously managed by Gerard McEvilly who has since taken on other responsibilities in the company. However, given the team approach through which we manage the R&D programs, he is still very involved in the avocado program.

I have been with Horticulture Australia (and previously HRDC) for the past five years, managing a number of fruit and vegetable industry R&D programs. Before that, I was with Queensland Fruit and Vegetable Growers co-ordinating their R&D investments across all industries and prior to that, I was employed with Queensland Department of Primary Industries in Central Queensland as an Extension Horticulturist working with a range of tropical industries.

Included with this issue of Talking Avocados is a copy of the Avocado Industry Report prepared by HAL. This report provides a snapshot of progress on some of the avocado levy funded R&D investment over the past year. Some exciting new projects are also underway for 2002/3.

The Avocado R&D Committee met with researchers in September to review the current R&D program. This meeting was extremely valuable for the researchers in terms of obtaining feedback from industry, but particularly for the R&D Committee to get a first hand account of the program prior to formulating plans for the next cycle of funding allocations. We intend to continue this process next year.

In managing the R&D program, we aim to ensure that the investment is well targeted and able to deliver real outcomes that benefit the industry. The R&D program is closely linked to the Avocado Industry Strategic Plan which was developed in consultation with the broader industry in 2000. It is critical that the R&D investment is directed towards the issues that industry have identified as priorities and the strategic plan is therefore a key reference.

Horticulture Australia in conjunction with AAGF have also commissioned an independent review of the R&D program. Given the program has been underway for about ten years and that significant additional investment will be made in years to come, it is prudent to step back and have an objective look at where we have come from, the key outcomes and benefits from previous investments and how we could possibly further improve the program into the future. The consultant team is currently interviewing key people throughout the industry and aim to complete the study by the end of the year.

The issue of crop forecasting is an ongoing challenge, not only for avocados, but for other horticultural industries. In trying to address this, we have commissioned a study to identify the most appropriate forecasting system that could be applied to the avocado industry.

The first stage of this process has been to evaluate the various systems used for avocados in other parts of the world and also by other industries in Australia and around the world. From this, we hope to identify a cost effective, practical model for avocados. This study should be completed by the end of this year.

Last year, we commissioned a study to identify potential export markets in response to the projected production increases. This has been completed and a summary was included in the last edition of Talking Avocados. The full report can be purchased from Horticulture Australia. The next step is to develop appropriate strategies to respond to the identified opportunities. These strategies will need to be driven by the commercial sector, but we anticipate a role for other players such as AAGF, HAL and service providers in supporting export development. Planning for this next step is in progress. It looks like an exciting year ahead for the program with a range of R&D activities covering not only on-farm but broader industry issues. We look forward to achieving outcomes of significant benefit to your industry.

*By John Tyas*

## Avocado Promotions

A detailed report for 2001/2 is included as a handout in this edition of Talking Avocados. This is the Annual Report to Industry for the expenditure of industry levies and includes a financial statement.



### July – August TV Promotion

The main activity has been the TV promotion in Sydney. With the lower crop forecast the decision was taken to restrict the campaign to the largest market – Sydney – for the July/August period. We ran 3 weeks of TV using the combination of 30sec and 15sec TVCs.



Wayne Prowse

One of the weeks was during the Commonwealth Games and we picked up some very good spots on channel seven. The December issue of TA will complete a full analysis of the market response.

More TV is planned for April/May in Brisbane to support the start of the Greenskin season, then through other states at appropriate times in 2003 subject to demand and supply. With growers achieving good prices for avocados it is important to keep the momentum of the advertising maintained.

### Public Relations

The public relations program is continuing to generate excellent media articles in support of Avocados. A segment on Fresh TV featured avocados on 8 October whilst recent magazine articles on avocados have appeared in Woman's Day, New Woman, Better Health, Heartwise (in conjunction with paid advertorial) 50 something (Seniors Magazine), Town & Country, Country Style and The Sun Herald.

### In Store Promotions

Avocado recipes leaflets have been distributed to many independents stores and some of the major chains in accordance with their promotion programs. With the lighter crop expected some of the planned retail promotions have been cut back whilst demand remained strong.

### Merchandising Program

Our retail development officers have been in the retail stores in July and September to follow up on the education of produce handlers and monitor the performance of Australian Avocados. In general the quality has been very good with few cases of poor quality avocados noted. This certainly shows the value of avoiding stockpiling and long storage of avocados. Consumers return for more avocados more often.

Reinforcing this, the few cases of poor quality product were found to be considerably aged stock that had been around too long and held on supermarket shelves long after they should have been discarded. This turns consumers off and impacts on sales.



# Planned irrigation can improve crop yields

Work conducted in the Sunshine Coast and Gympie regions is showing that improved irrigation practices can benefit crop yields as well as reduce water usage.

Irrigation field officer Matt Dagan has been working with local irrigators on a variety of annual and perennial crops to assist them to make the most of their water, as part of Queensland Fruit & Vegetable Growers' Water for Profit program.

"Most people know that plants will suffer from a lack of water but to modify an old cliche, water ain't water," Mr Dagan said.

"In other words, just by giving your crop a drink once a week or every day doesn't always meet the crop's requirements. You need to tailor your irrigation to your crop, soil types and climatic conditions.

"You can gain considerable benefits by putting greater effort into managing your irrigation," Mr Dagan said.

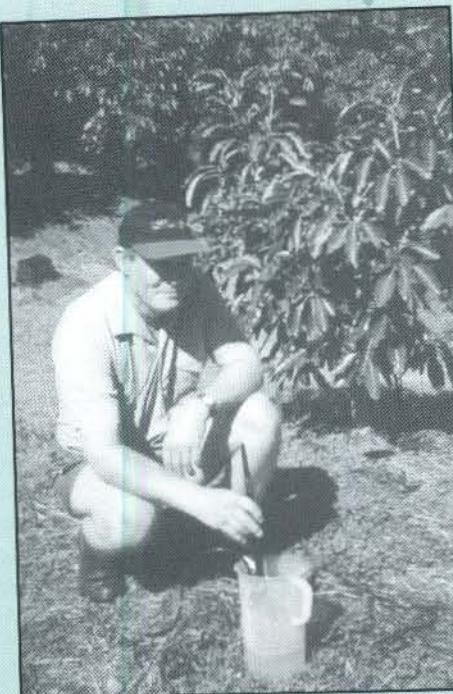
Trials around the State have shown that irrigation system infrastructure also needs to be operating well as uneven water application can have a negative impact on crop yield.

This can result in uneven fruit size, irregular quality and increased harvest costs.

"When combined with additional costs such as unnecessary pumping, wasted fertilisers, preventable system maintenance and repairs, the total out of pocket amount for growers can be substantial," Mr Dagan said.

Sunshine Coast avocado grower Frank Ross has spent considerable time modifying his irrigation system. His changes included:

- replacing a variety of scattered micro-sprinklers with one type



Frank Ross

- altering lateral sizes to better regulate pressures down slopes
- upgrading main and sub-main pipes to replace worn sections
- improving the filter system to reduce blockages and maintenance problems
- connecting a pressure tank to a pump to better regulate system pressures.

"The system we have now is as good as it gets," Mr Ross said.

"This season we're seeing a significant increase in yield, I'd say almost double on the last few years."

"While there are other issues that have contributed to the improved yield, such as nutrition, the irrigation system has played a vital part," he added.

A system operating at optimum condition still requires careful management to give the best possible result. Mr Dagan believes that measuring the soil moisture is one way that allows growers to best meet their crop's water requirements.

"Knowing how much water your crop requires and when it's needed allows you to grow the best possible product while maximising the usage of limited water resources," he said.

Ken Webb, another Sunshine coast grower, has been using a soil moisture monitoring tool for more than 12 months and has made significant changes to his irrigation management.

His set-up comprises a portable capacitance probe used as a soil moisture monitoring tool, several monitoring sites located at various soil types around the farm, regular readings of soil moisture at each site (2-3 times each week), and an irrigation scheduling based on re-fill points and field capacity levels.

"Since regularly monitoring our soil moisture we've reduced our water usage by almost 60 per cent and that reduction occurred during the hot, dry conditions we had over 2001-2002.

"In better years, the savings may be even greater," Mr Webb said.

"The trees have never looked better and we are getting similar, if not better, fruit quality and quantity," he added.

cont. from page 10

## Export Activity

Following the export study completed last year, a small project team of agribusiness student from University of Queensland Gatton are studying the consumption patterns and market segmentation of avocados in Hong Kong. The Hong Kong market is approx 1,500 tonnes yet is one of Australia's main avocado export destinations (for our small export volume). The study will help qualify the potential of the Hong Kong market that may be further followed up by participation at the HOFEX trade fair in Hong Kong next April where Horticulture Australia will be exhibiting.



The main recommendation from the study last year demonstrated the potential in Europe. Horticulture Australia will be exhibiting a number of horticultural products at Fruit Logistica in Berlin next January and will include Avocados and a chance to follow up and generate leads with potential importers from Germany, UK, Scandinavia, Spain and other European markets.

For more information contact:  
Wayne Prowse

[wayne.prowse@horticulture.com.au](mailto:wayne.prowse@horticulture.com.au)

# SnackFruit 2002 Conference

## What drives the consumer?

By Rosemary Stanton - OAM PhD APD

Australia almost certainly has the world's best supply of fresh food. But many Australians don't eat well and diet-related health problems are common. Overweight and obesity are especially common and occur among all sections of the population, affecting 64% of men, 47% of women and 20% of children. Our rates of coronary heart disease, high blood pressure, type 2 diabetes, some cancers and gallstones are also high and all are related either to eating too much or to high levels of fat, salt and sugar.

### Ample evidence that vegetables and fruits are protective against many health problems.

There is ample evidence from hundreds of studies that vegetables and fruits are protective against many health problems, but either the public doesn't know, doesn't believe it or doesn't care - or perhaps there is so much competition for our finite stomach that the healthy eating message is drowned out. We need to look at why this is occurring and which of the forces working against Consumption of fruits and vegetables we can tackle.

Nutritionists are always being accused of changing their minds. But over the last 40-50 years, the basic messages about nutrition have changed very little. The major messages have emphasised more plant-based foods like vegetables and fruits and less saturated fat, sugar and salt.

In spite of this constant message, many Australians make poor food choices, although we have increased our consumption of 'good' fats and we're eating less meat. But with vegetables, we are eating fewer greens and more fried potatoes and with fruit, a large proportion of people fail to eat it on a daily basis. We need to ask why.

### The influence of advertising

The food supply has changed dramatically in my lifetime. In the 1950s and 60's - before Australians shopped in supermarkets - we had about 600 different foods to choose from. Most women worked out the family's diet - usually based on how much money they had, what was in season and what the family (especially the husband) was used to eating. Women (or children) then went to a series of small shops to make their purchases or a regular order was delivered to the door.

There were advertisements for foods in magazines and newspapers, and on the radio and these influenced purchases. But in the 1950s, most children were not exposed to TV food ads. These were also the days when kids walked to school, went off for the day on their bikes and played freely in the bush or at the beach throughout school holidays. Not surprisingly, obesity in children was much less common than it is today.

Nowadays, supermarkets stock up to 15,000 items. No one can buy them all and we need to make more daily decisions about what we will eat. A huge industry lies waiting to help us with the complexities of so much choice. It's called marketing and it includes the highly persuasive elements of advertising and promotions. Like most things, these can be used or abused.



### Marketing

Marketing is powerful. It encourages us to eat hamburgers that by almost any definition are a poor imitation of what we know a really good hamburger can taste like. It leads people to buy chicken soup that has less than 0.5% chicken. Marketing also pushes parents to put a packet of some snack food into their children's lunch-boxes because they've been convinced their child will feel left out if they don't. What is actually left out is fruit.

We now eat whether we are hungry or not because marketing creates such tempting food images.

Perhaps most alarming of all, we have now been convinced that cooking is too difficult and time-consuming, so we should settle for prepared or processed foods. Even breakfast cereals - that take less than 5 minutes to eat - are being turned into bars to eat in the car. These products have extra sugar and fat to make them stick together and come without the dental and nutritional benefits you get from serving milk with cereal. This is marketing.

Marketing has also decreed that any food designated as a snack food must come in an individually wrapped package. This is an environmental and nutritional disaster.

With a basic aim to encourage us all to eat more, the processed food industry directs advertisements at everyone, including children who are below the age at which they can distinguish between information and intent to persuade. Advertising encourages young children to pester their parents to purchase various foods and drinks and the ads shown in kid's programs overwhelming are for junk foods. There are no ads for carrots - and very few for fruit, so it's not really surprising that so many children have unbalanced diets and the number who are overweight doubled between the two most recent national surveys in 1985 and 1995. The number of children classified as obese tripled over this period.

It's the same in other countries, and again, it's not really surprising. Check what children see advertised in the US.

Our Australian data also shows how children's diets deteriorate as they respond to advertising and eat more packaged foods. Again, what gives way is fruit.

Some might see it as conspiracy theory, but companies selling junk foods tend to stick together. This has been documented for snack foods and soft drinks.

Every set of dietary guidelines produced in Australia has called for the population to reduce their salt intake and keep sugar intake low. The salt guideline deserves especially high priority because high blood pressure (which results from being overweight, eating too much fat and too much salt) is the most common reason for visiting a General Practitioner in Australia. If we halved our current salt intake, it would save millions in medical costs, although such a change could also cost the soft drink industry billions of dollars.

Everyone knows that potato crisps or salted snacks make you reach for a drink - but no one had put numbers on it until recently.

*cont. page 17*

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# Quality in Distant Markets

By Dr Henry Pak and Dr Jonathan Dixon - New Zealand Avocado Industry Council

## Introduction...

Avocados have a limited storage life and with export to distant markets the majority of this storage life may be consumed by the long transportation times required to reach their destination. Transport to distant markets is also an expensive process, adding to the costs of production.

To remain competitive, the exporting country must develop a reputation as a consistent supplier of high quality product. This poses a number of challenges since the fruit not only have to survive the transportation process but must also have sufficient remaining storage and shelf life to pass through the marketing chain and deliver fruit of high quality.

The development of most storage disorders is related to fruit age that is, the length of time since the fruit were picked. Fruit quality deteriorates as fruit age increases. Shorter storage times and transport distances are more forgiving of fruit quality, since fruit can be consumed before storage disorders have an opportunity to develop.

For distant markets, however, short of reducing transport times, the only other approach to improve out-turn quality is to improve the inherent quality of the fruit.

Overcoming the quality problems associated with export to distant markets requires a multi-faceted approach. Production of high quality fruit is a continuous process throughout the production chain, with the quality of fruit entering this chain being the ultimate determinant of subsequent storage life. Systems need to be implemented and continually refined throughout the packing and coolstore chains to ensure that fruit quality is maintained.

## The New Zealand Solution ...

Prior to the start of the 2000 export season the New Zealand industry had only minimal criteria to define fruit quality, a limited understanding of those factors determining fruit quality at out-turn, no methods for monitoring fruit quality through the production chain, and no methods for predicting likely out-turn losses. There has also been no financial incentive for growers to modify their orchard management, as there has been no way of tracking the quality of individual lines of fruit.

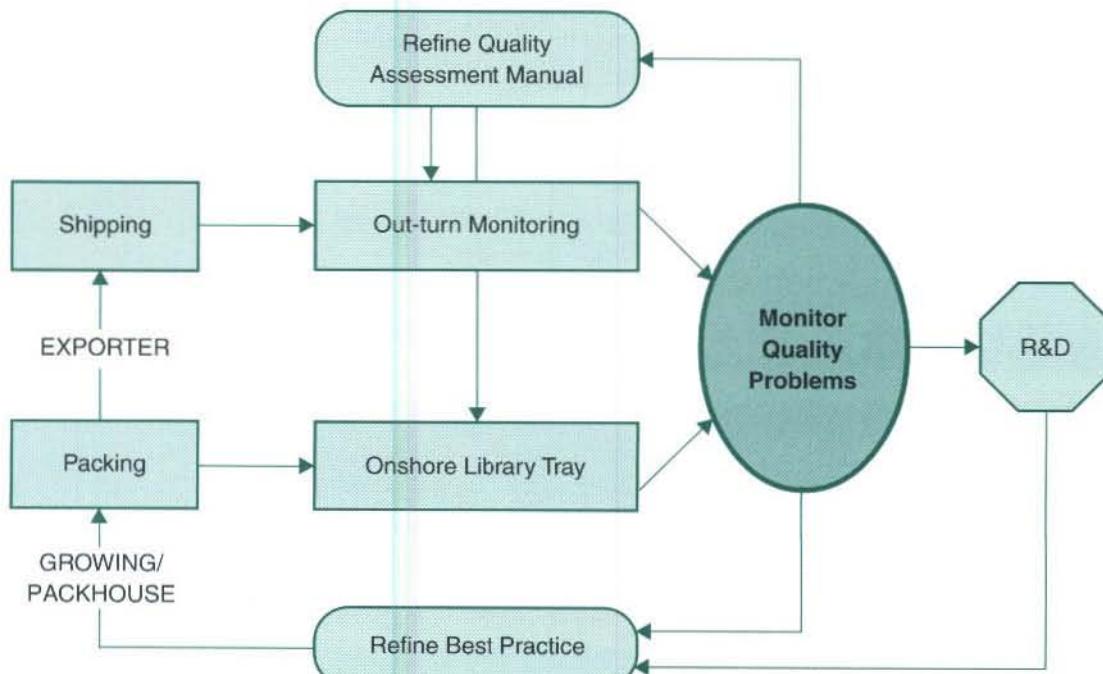
Given the limitations imposed by distance from market, and the lack of detailed information on quality problems in the market, the New Zealand Avocado Industry Council (AIC) commenced the 2000 export season on the basis that the better the quality of fruit that leaves New Zealand, the better the quality at out-turn.

The New Zealand industry embarked on a process to continually improve fruit quality, illustrated schematically in Figure 1.

A best practice manual was prepared, that provided guidelines on management practices and handling systems that minimised fruit quality loss at each stage of the handling process from picking to loading on a ship. This manual was provided to all registered packhouses and exporters in New Zealand.

In addition, a library system was established for monitoring fruit quality for individual growers. Samples were taken from lines of fruit as they were packed and held in conditions simulating shipping before ripening and evaluation of fruit quality. Results from these library trays identified the quality problems inherent in the fruit or onshore handling systems before transport to distant markets. Comparison of library samples with samples taken at out-turn in the USA, served to identify any problems which might have arisen

Figure 1: Process for continuous improvement of export fruit utilised by the New Zealand Industry



as a consequence of the shipping or handling system, once the fruit has left the packhouse.

Together the information collected from the onshore library trays and the out-turn monitoring defined the exact nature and extent of any quality problems. The stage in the production chain at which quality problems arose was also determined. Once the nature of the problem had been defined, the R&D programme could be better targeted to develop more appropriate control strategies. Once implemented, these strategies can be continually refined with feedback from fruit quality evaluations.

### **Out-turn monitoring...**

In order to develop appropriate control strategies, it was first necessary to clearly identify the quality issues that needed to be targeted. Without good market intelligence it was difficult to obtain accurate information on the extent of any quality problems or their relative importance.

In order to obtain precise information on the quality of fruit arrivals and the extent of any quality problems the AIC implemented an out-turn monitoring programme in the USA. An AIC staff member was based in Los Angeles for a period of 4 months. Fruit samples were collected from the USA handlers once a week to monitor fruit quality. Digital photographs were sent back to New Zealand to enable immediate diagnosis of quality problems as they arose. Detailed information was fed back to each exporter on the state of their fruit.

The information gathered by the out-turn monitoring programme allowed key issues to be identified that impacted on fruit quality such as fruit age and shipping systems.

For the first time exporters of New Zealand avocados had detailed information on fruit quality from an independent, impartial source. This allowed the avocado industry and exporters to manage, in close to real time, fruit quality problems as they arose during the export season. Identifying the fruit quality issues and possible causes of quality problems as early as possible, by utilising a scientific approach to fruit quality measurement, enabled detrimental effects on the market perception of fruit quality to be minimised.

### **Fruit quality assessment manual...**

Assessment of fruit quality is central to the process outlined in Figure 1. For this reason, the AIC developed a fruit quality assessment manual, which was provided to all registered packhouses and exporters. This ensured that all assessments of fruit quality throughout the industry was comparable. The manual is also updated on an annual basis to ensure thorough coverage of the quality disorders present.

### **Onshore library trays...**

As part of the best practice manual, all sheds were strongly encouraged to hold library trays for evaluation of fruit quality. The best practice manual provided a standard protocol for the collection, storage and evaluation of library trays. Training was provided to sheds on how to evaluate fruit quality, to ensure that assessments were standardized.

For most growers library tray information was the only feedback they receive of their fruit quality. It also provided a basis for comparison with shed and industry averages. For individual growers, information provided on their fruit quality could provide the stimulus to improve orchard management systems. Once changes had been implemented, the feedback on fruit quality allowed growers to determine whether the additional expense has been warranted.

This was especially true of preventative fungicide control programmes, where the benefit was not immediately obvious and could not be determined from packout rates or reject analyses provided by the shed.

### **Best Practice Manual...**

At no stage during the handling chain was it possible to improve fruit quality after the fruit has been picked. Instead, the best that could be achieved was to prevent deterioration in quality. Therefore, the best strategies to adopt for improving fruit quality at out-turn was to ensure that only the best quality product entered the distribution chain, and to minimize the opportunities for deterioration in fruit quality at each stage of the fruit production and handling chain.

In New Zealand this has been achieved by providing information to packhouses on procedures for handling fruit to minimise harmful practices that impact on fruit quality.

A best practice manual has been developed to highlight those factors throughout the fruit production and handling chain from the orchard to the market shelf, which impact on fruit quality. The cumulative effect of these small improvements in maintaining fruit quality can lead to large gains in fruit quality in the market.

The best practice manual has identified a number of key areas where improvements in practice can be made such as harvesting and handling procedures. The manual is revised yearly incorporating results from the industry R&D programme.

The information contained within the fruit quality database, generated from both the onshore library tray evaluations and out-turn monitoring, can be used to measure individual shed or grower performance. This information can be used to identify which fruit production and handling practices are beneficial for maintaining avocado fruit quality and that could be implemented throughout the industry.

### **R&D programme...**

The R&D programme for the 2000 season was focused strongly on the issue of post-harvest fruit quality, especially on rots. Major emphasis was placed on the issue of rots developing on green fruit while still in coolstore, a disorder commonly referred to as "measles". Out-turn monitoring and onshore library tray results clearly showed "measles" was not a major fruit quality issue during the 2000 season.

The results obtained from the fruit quality database from the 2000 season highlighted other specific issues that needed to be addressed in the 2001 R&D programme. An example was the high incidence of stem-end rots that were recorded in the 2000 season. Priority will be given to developing new control strategies to overcome this disorder.

### **Summary...**

The quality improvement process implemented has undoubtedly been a success. Both the industry structure and the active participation of all the sectors have been major contributing factors to this success. However, the real benefits will accrue in the following seasons, with the systems now in place to capture information on fruit quality and relate this back to handling practices.

*This article was taken from a presentation at the 2001 Australian and New Zealand Avocado Conference.*

# SCAGA Success – at EKKA 2002 Promotion

At the beginning of every August the country meets the city in Brisbane at the annual horticultural show, the EKKA. Every year, the Sunshine Coast Avocado Growers Association (SCAGA) organises a display in the Horticultural Pavilion.

The committee meets months ahead and plans the success of each show. With a lot of personal contributions and time input, the members put in place a display which is both educational and fun to look at.

In the last two years SCAGA has organised an interactive display, involving the visitor in games and giving away prizes in the form of a small net with avocados.

## Static Display in 2002

This year however, it was decided to make a static display by showing the visitor where in Australia avocado plantations can be found, the volume of fruit from each area and how many planted trees per area. Simon Newett from DPI gathered all the necessary information.

The back wall of the display stand lent itself perfectly for a map of Australia with all the growing regions marked. SCAGA organised a local artist to put the idea onto canvas. The result was stunning and there were many comments from the visitors.



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### People surprised avocados grown in most states

A lot of people had absolutely no idea that avocados were actually grown in almost all the States. West Australia specially was a big surprise. Nobody realised that there is a huge production coming from the West. Everybody thought that Victoria and South Australia were far too cold to grow avocados. Some people were disappointed that SCAGA did not have a game this year.

It showed once again that we can educate the consumer. The interest is certainly there.

### Questions asked on the treatment of avocados

There are more than 100,000 people per day visiting the EKKA. If we take 25% of all those people to come to the Horticultural Pavilion, 25,000 people per day walk past the display. If from those 25,000 people 5% notice the display and remember avocados next time they go shopping, we have achieved a hell of a lot.

Many questions were asked about the treatment of avocados once they are purchased. Where and how does the consumer store the fruit, when is it ripe, how to store it once it is cut open and only part of the fruit is eaten.

### People do want to buy other varieties

The overall comment from visitors was very positive. There were almost no complaints about bad quality. There was a lot of interest for Reed, and all the time the question came, "Where can we buy those big avocados?" Maybe this is something our Marketing People should take into account, when they sell fruit to the Supermarkets. People do want to buy other varieties, not just Hass.

SCAGA would like to take this opportunity to thank all the members who voluntarily manned the stand for their efforts. A special thanks goes to the group of growers from Tamborine Mountains who take their turn at looking after the display every year. Natures Fruit Company in Nambour sponsored all our display fruit. Many thanks - it is greatly appreciated.

*Article and photos supplied by Ursula Starkovsky of SCAGA.*

*cont. from page 12*

Researchers at St George's Hospital Medical School in London compared salt intake with urine volume, which reflects how much people drink. They found that if people reduced their average daily salt consumption from 10 grams to 5 grams (as currently recommended), they would drink 350 mL less fluid a day - equivalent to one can of beer or soft drink.

The researchers calculated that such a reduction would dramatically slash sales of soft drinks (and beer). They also noted that the companies that make soft drinks are also moving to produce or form alliances with producers of salty snacks. For example, PepsiCo owns Frito-Lay, major sellers of crisps in the US while Coca-Cola have a deal with Proctor and Gamble with Pringles potato crisps.

Salty snacks and sugary soft drinks - and the marketing blitz behind them - are contributors to increased obesity among children and adolescents. About 85% of the sugar and salt we currently consume comes ready to eat in processed foods.

There is a gradual realisation that we need some urgent and major changes to what Australians eat. We can make changes because we want to alleviate health problems. Or we can make changes because the future costs of treating the health problems caused by poor diet will be so great that they will inevitably mean cuts in other areas of public spending.

There is absolute agreement among health professionals that we need to increase the intake of vegetables and fruit. But the message is drowned out by the much louder promotion that come from advertising. It will continue to be an unheeded message unless we change tack.

I believe we can only increase consumption of vegetables and fruits if we do something about the packaged junk foods that are replacing the health-giving foods and set in place some structural reforms. I suggest we start with protecting the health of the most vulnerable and important group in our society - children.

Advertising influences purchasing behaviour of children and adults. We could counter junk food advertising with a greater amount of advertising for vegetables and fruit. But it won't happen because advertising costs heaps and selling straight unadulterated products doesn't generate the kind of revenue needed. With junk foods, where only a small amount of some basic food is included and this is then diluted with cheap fillers, the end price allows for a substantial advertising budget.

In the US, food and food service companies spend more than \$US11 billion dollars/year on direct media advertising, and claim that for every dollar spent in this measured way, another two dollars is spent on discount incentives, including slotting fees to buy specific spots.

Nearly 70% of advertising in the US goes on convenience foods, confectionary snacks, alcoholic beverages, soft drinks and desserts. Just 2.2% is for fruits, vegetables, grains and beans. What hope do those of us promoting healthy eating have against this distortion of dietary advice?

I think we have two options - and I think we should do both.

### **1. Ban the advertising of junk foods to kids.**

Even though there is clear evidence that sales of foods and beverages increase with the intensity, repetition and visibility of the advertising message, we turn a blind eye to its effects on children. There are even some absurd rationalizations of its effects on children, with claims made by some advertisers that they should be allowed to sell to children in this way because 'advertising to children doesn't work'.

Of course advertising works, otherwise no company would spend millions of dollars on it. And by directing advertisements for junk foods to young children, we exploit them. It's hard to see why we allow it and I believe we need to form a coalition of groups opposed to the advertising of junk foods during children's television programs.

The Cancer Councils in Australia see protecting the future health of children as a major priority. They are seriously considering strong advocacy to ban advertising of junk foods for children.

General Practitioners (Divisions of General Practice) have also called for a ban. A group in South Australia - a coalition of people including individuals and representatives from Young Media Australia, the Dietitians Association of Australia, the Public Health Association, the Australian National Youth Alliance and the Australian Consumers Association - are working on coordinating a ban on television advertising of junk foods directed at children. I think there is also potential support from Nutrition Australia, the National Heart Foundation and Diabetes Australia.

I would suggest those marketing fresh fruits and vegetables back this movement, lobbying and using contacts in governments around Australia to bring attention to the problems of poor diet and the advertising of junk foods to kids.

### **2. Advertise fresh produce to a much greater extent.**

This requires even more intense political lobbying than banning junk food ads. Let's look at why.

The budgets for advertising and promotions are generated from 'value (p)adding' basic foods. There are currently few ads for straight foods like fruits and vegetables because there is little leeway in the pricing to pay the high costs of advertising.

Let's take the example of potatoes. Fresh potatoes sell for \$1-2/kg, and have very little budget for advertising. Add some cheap fat and turn them into potato chips and they sell for \$3-12, providing a budget for promotion. Process them even further to potato crisps and you increase the price to \$20/kg, allowing even more dollars for advertising and promotion. Once this occurs, you get children taking crisps to school instead of fruit.

I'm not suggesting you look for ways to pad the value of fruit. That would take it off its pedestal and you would lose its health benefit. We can see what happens down this path with products like fruit roll-ups where the fruit is diluted with heaps of sugar. These foods do not promote fruit - they actively work against it with advertisements in which kids chose the roll-ups instead of fruit. Some ads for roll-ups even condemned fresh fruit, with kids saying fruit is "messy and squashy".

Fortunately, consumers aren't stupid and most women don't think of fruit roll-ups as fruit. They see such products as confectionery - which they are, especially in terms of damage to children's teeth. Compulsory percentage labelling will help put these products in their place. For example, by December 2002, the 'strawberry fruit bar' will need to declare on its label that its content of strawberry is zero.

The reason why my suggestion will require intense political lobbying is that if you are going to promote fresh fruit and vegetables, you need a realistic budget to do it. The obvious source - at least to me - is to add a tax on junk foods and use the money raised to fund good nutrition education programs, including the adequate promotion of fresh fruit and vegetables.

In the US, 18 states and one major city add a small tax to soft drinks and confectionery. Unfortunately, this has not been earmarked for health promotion at present, although there are strong calls for that to occur.

We currently add a GST to confectionery, soft drinks, snack foods, biscuits, cakes and fast foods. Except for the fast foods, these other items used to attract wholesale sales tax of 12.5-22%. When the GST came in, they paid less.

We need Australians to eat less of the foods that attract the GST. When McDonalds were forced to add 10% GST to their meals, they complained that their sales fell. If we imposed an extra tax onto junk foods that currently attract the GST, we would have a decent budget to spend on promoting good foods.

Would consumers complain if they had to pay a little more for junk foods? Some will. Will the food industry complain? Absolutely. We know that every time the government increases the tax on cigarettes, more people stop smoking. Kids are especially susceptible to increased prices so an extra tax would reduce sales of junk foods.

The food industry is powerful and often wins whatever it wants. But not always. The Australian Food and Grocery Council campaigned long and hard against ingredient labelling, against having to include the percentage of major ingredients in foods and against compulsory nutrition labelling. Contrary to their expectations, they lost on all counts. Why? Because ordinary citizens and groups such as the National Heart Foundation and the Public Health Association lobbied state Ministers for Health putting forward convincing arguments as to the wisdom of telling people more about what they are eating.

I believe it is time to start lobbying for both my suggestions:

- no advertisements for junk foods during kid's programs, and
- a tax on junk foods.

It is time now because the latest health statistics from the Australian Institute of Health and Welfare show that we have problems. Children have increased their kilojoule intake by up to 13% over the last 10 years. Why? Because they eat more and move less. And the foods they are eating more of are snacks and soft drinks - heavily advertised junk foods.

If we don't lobby hard, we won't get such changes. The alternative is to watch our kids getting ever fatter and our health bill escalating as various health problems continue to increase. As citizens, can we afford not to get started on these initiatives? As an industry, can fruit growers afford to let the market be dominated by well-marketed junk foods?

### What about the public reaction?

The news is not all bad. Even though many people succumb to the marketing efforts of those selling highly processed foods, many more Australians are now aware of health compared with a few years ago. Awareness comes first – action follows.

People used to think healthy eating was boring. A survey done a couple of years ago found that 75% of people no longer see healthy foods as boring. That's a start.

Surveys also show that many people are concerned about the integrity of food. They want to know where their food has been and what's been done to it. A recent survey (April 2002), found that 92% of Australians want all genetically modified foods labelled and two thirds oppose all genetic modification of foods. Many also query what's behind year-round availability of foods.

We also know that people like 'natural' foods - especially women shoppers. They want fruits and vegetables without pesticide residues. Many also want 'organically grown produce', although few are prepared to pay for it. They also want confirmation that the products are genuinely organic. It's an area to watch carefully and perhaps one that needs better marketing-efforts. 'Organic' sounds good to many but has an undeserved 'dreary' image to a few. But organically grown foods will undoubtedly grow in popularity and it's a trend worth following.

Many people in Australia who are concerned about GM foods ask which fruits and vegetables have been modified. It is important to tell people that no Australian fresh produce is genetically modified.

The processed food industry is well aware of the growing interest in healthy food. They are working feverishly to produce functional foods. These are foods with some extra nutritional value - something to make the food as good as fruit and vegetables - which seems absurd when we already have fruit and vegetables!

### Let's turn now to the subject of snacking

In theory, there's nothing wrong with snacking. Eating small and often has been shown to reduce cholesterol or blunt adverse insulin responses. However, these beneficial effects may occur only in formal studies where nutritious snacks are provided to subjects as part of a set total daily energy intake.

The rigidity of formal research studies makes it easy to fit snacks into each person's calculated energy requirements. In most snacking studies, subjects are either given half their previous meal between meals or they are given healthy snacks like fruit or yoghurt. The good results from these studies do not necessarily translate to packets of junk snack foods.

In formal studies, those given snacks eat less at the meal before or the one after so as to keep their total food intake constant. In real life, most people do not reduce their energy intake by an equivalent amount if they eat a snack between meals. Snacks are usually eaten as extras, in addition to regular meals.

About the only way I can see that snacks fit into a healthy eating pattern is if the snacks are healthy items like fresh fruit. It's the obvious choice - to a nutritionist, but not to the general public and certainly not to the processed food industry who believe snacks are only snacks if they crunch and come in a packet.

Data from the Australian National Nutrition Survey show where you should be directing your energies for increased fruit consumption.

In Australia, males rapidly gain excess weight after they finish their growth spurt. Among 16-18 year-olds, 22% are overweight or obese. This increases to 38% of 19-24 year-olds and jumps dramatically to 62% of 25-44 year-olds.

There are many reasons for these startling statistics, but a misfit between hunger and energy needs may be relevant. Most teenage boys learn to cater for the high energy requirements of growth and activity by eating lots of food at meals as well as hearty snacks between meals. When their energy needs decrease during their late teens and 20s, many continue to eat according to their hunger 'memory'.

One solution would be to encourage fruit as a snack food. Although fruit is regarded by some as a snack food, the lowest fruit consumption occurs in males aged 19-24 with only 32% of this group consuming fruit. Males should be specifically targeted to increase fruit consumption.

Young children have the best record of eating fruit with 78% of 2-3 year-old boys and 75% of girls including fruit on the day of the last National Nutrition Survey. Ideally, 100% of every age group would eat fruit on a daily basis, but 78% of the very young age group (and almost as many women over 65 - 76%) is the best we have. Overall, though, all age groups need to increase fruit consumption.

I would like to finish by looking at some of the problems that work against the marketing of healthy foods.

### A healthy diet involves balance, variety and moderation'.

In theory, this is correct but in practice, no self-respecting marketing expert who wanted to effect change would ever use such terms. These are 'feel good' terms designed as an 'out' to deflect criticism away from junk foods. This saying is only used to justify why someone is eating junk.

An Internal memo from McDonald's says it all: "McDonald's should attempt to deflect the basic negative thrust of our critics. How do we do this? By talking 'moderation and balance'. We can't really address or defend nutrition. We don't sell nutrition and people don't come to McDonald's for nutrition."

**"There are no good or bad foods,  
only good or bad diets"**

Another slogan trotted out by those selling junk foods. If there are no bad foods, I want to know what is in a 'bad' diet and also why this line is used only to block criticism of less nutritious foods. Why is the food industry lobbying so hard for health claims to be permitted, if it's not to promote 'good' products?

**"All foods can be part of a healthy diet"**

This is no longer true when there are so many foods. No one can eat them all. Again, this is used to justify promotions and advertising of junk foods.

**"Experts are always changing their minds"**

This is used to give people a reason not to bother making changes. In fact, as we have noted, the basis of a healthy diet (vegetables, fruit, wholegrains, fish) has not changed. The confusion arises because those selling particular products promote them before all the evidence is in.

**"We only give consumers what they want"**

So who asked for 155 breakfast cereals or 15 flavours of potato crisps? And why does the food industry oppose consumer requests. If 92% of Australians want all genetically modified foods labelled, why won't the food industry do it.

This line is also used to justify selling some fresh produce all year round. In fact, consumers are happy to wait for particular fruits to come into season, especially if they know when the season is for that product. Many also say they distrust what happens to fruits sold out of season.

**"We all need to work together"**

When you have too many people trying to work together you just get lots of meetings and some fat reports. We need action and while it's always good to work together, it is immensely complicated and subject to abuse. I think fruit growers and marketers really need to work on their own - against the competition, not swamped by it.

**"Dietary changes only benefit a few  
'responders'"**

This is designed to sow doubts in people's mind that they need to make dietary changes. In fact, everyone benefits from healthy eating.

**"We need functional foods & health claims to fix health problems"**

Why does the processed food industry spend so much time and effort trying to produce these fancy foods with their unknown benefits and potential problems? Because it's more profitable to sell a cracker with added lycopene than it is to sell a tomato. Functional foods are primarily a marketing exercise.

**"Advertising is part of life, so should not be restricted for children."**

There is plenty of evidence that children should not be subjected to influences which they are not yet able to judge wisely.

"Those who promote healthy eating are food police, food nazis or (since last September) food terrorists."

This is an attempt to marginalise anyone who criticises food products. Once you marginalise people, you can then ignore them or sideline them as ratbags.

We could talk about the real meaning of many more statements, but let's turn to some positive actions we need to take. We don't yet know everything about human nutrition, but we have a pretty good idea of what a healthy diet should contain. For general good health and also to tackle almost every health problem, we need to eat more vegetables and fruit. Where we fail is in our efforts to get people to eat these healthy and delicious foods in the face of so much competition. I suggest we need to:

- 1. Stop advertising when children are the main viewing audience.** This is not especially radical and already occurs in parts of Canada, in Scandinavian countries and for some products in the Netherlands. We already restrict advertising of alcohol to certain times and do not allow advertising of cigarettes. We could start by prohibiting ads in children's programs for most of the foods that currently are non essential as classified by the GST.
- 2. Impose a tax on junk foods and earmark the proceeds for nutrition education.**  
Again the same criteria can be used to determine which foods need an extra tax.
- 3. Ban sales of junk foods in school canteens.**  
I have no problem with party foods being used for parties, but, just as we don't allow kids to wear party clothes to school every day, it's inappropriate for them to eat party foods every day. No teacher can teach good nutrition if the school is selling a different story. And we also know that the kids who eat the most junk foods eat the least fruit.
- 4. Increase the push for nutrition information on food products, including a prominent display for fast foods - including 'meal deals'.** For example, KFC is currently advertising a meal deal of 3 pieces of chicken plus chips, potato and gravy, a dinner roll, a soft drink and a picnic chocolate bar. Together these foods provide a massive 82g of fat (mostly saturated) and 6400 kJ. Do we really need more research into why Australians are getting fatter? No one could claim this meal represents 'balance, variety and moderation'.

**5. Lobby for change**

- 6. Stand up and speak out** against tactics used by some companies or organisations to quieten those who oppose their promotions.  
Good research is undoubtedly important in the complex interactions between diet and health. But even when the evidence in favour of promoting vegetables and fruit is strong, if we don't tackle the major forces directing the diet against these products, we will continue to see consumption of vegetables and fruits decreasing.

Years ago, we had a group of health professionals in NSW called MOP-UP (Movement Opposed to the Promotion of Unhealthy Products). It concentrated largely on cigarette promotion at the time, although it also criticised sugary junk foods. We need a new MOP-UP and it needs citizens whose goal is to counter the relentless drive to turn everyone into consumers of junk foods. Citizens' speak out for the common good; consumers just eat more.

# AUSTRALIAN AGENT for AVO-JECT SYRINGES

Aongatete, the New Zealand supplier of Avo-Ject syringes for the control of phytophthora in avocado trees, have recently announced the appointment of John & Chris Tannock of Ravensbourne as their Australian agent.

Chris and John came into the avocado industry about five years ago seeking a change in lifestyle. They purchased an orchard in the Ravensbourne district about 50km to the north of Toowoomba. "The lifestyle was great for the first three or four months," Chris said, "until we invited a consultant to visit the farm and give us advice. It was then we discovered there was more to growing avocados than mowing the lawn and slashing and poisoning weeds!"

Like many other growers, John & Chris switched from injecting to spraying a couple of years ago because of the reduced labour costs. "We were pretty diligent in observing the phosphorous acid levels in our root systems the first year, in order to establish an effective spraying pattern," John said. "Having achieved good results in terms of root levels, we followed the same spraying pattern the second year."

All appeared well until early this year when approximately 15% of John & Chris' orchard suddenly went belly-up with phytophthora with some trees dying. Through Graeme Thomas, their consultant, they immediately ran some tests and found that the root levels had



*John & Chris Tannock*

not reached the control level of 25 ppm phosphorous acid, even though the same spraying pattern had done so the year before. The decision was then made to go back to the system that had worked before, i.e. injecting.

"The next decision was which type of injecting system to use. There are a number of effective options available to growers and different options will suit different orchards. We had some low pressure syringes here but felt we needed to obtain more to save time in the orchard or switch to a different system. I finally decided the best option for us was the Avo-Ject syringe for three reasons," John said.

"Firstly, the price was hard to beat, secondly, we could control exactly how much chemical was being injected per syringe and thirdly, because there is no heavy spring to pull against, I could get Chris to do the injecting!"

Low pressure as opposed to high pressure importantly means that the phosphorous acid isn't forced into "spaces" in the xylem where it may harm the tree or isn't easily drawn up by the leaves. (Phosphorous acid in the leaves is subsequently translocated by the roots).

"The entire orchard has since been injected. We found the Avo-Ject syringes easy to use and very effective. When the opportunity arose to be participate in the supply of the syringes to other Australian growers, we were happy to be involved."

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# USE OF FOLIAR APPLICATIONS OF PHOSPHONATE FUNGICIDE TO CONTROL PHYTOPHTHORA ROOT ROT IN AVOCADOS

By A.W. Whiley, J. Leonardi, K.G. Pegg, and P.W. Langdon - Queensland Horticulture Institute

## Introduction...

Phytophthora root rot (*Phytophthora cinnamomi* Rands) is a significant root disease of avocados growing in all states of Australia. In 1987, a 20% formulation of phosphonate (active ingredient: mono-dipotassium phosphonate) was registered as a fungicide for trunk injection or as a 0.1% foliar spray to control Phytophthora root rot of avocados (Pegg et al. 1987; Guest et al. 1995; Whiley et al. 1995). Trunk-injected phosphonate fungicide applied twice per growing season has proved to be very effective in the control of Phytophthora root rot in avocados (Pegg et al. 1985; Pegg et al. 1987). However, the registered 0.1% phosphonate foliar treatment has not been as successful in controlling the disease when used on mature, fruiting trees.

Increases in the cost of production along with near static returns resulted in the Australian avocado industry commissioning research to investigate alternative methods to apply phosphonate fungicides. Methods investigated included soil drenching through fertigation systems and the development of new formulations of mono-dipotassium phosphonate that can be foliar-applied at higher concentrations than the registered 0.1% phosphonate spray. Application of phosphonate through soil drenching was found uneconomical (Kaiser and Whiley, 1998) and it is believed that such drenches may increase the risk for pathogen resistance to develop (Weinert et al., 1997). Foliar sprays of phosphonate fungicides have previously been found to cause leaf burn and excessive leaf drop in avocado trees. This paper details results following foliar application of new formulations of mono-dipotassium phosphonate to avocado trees for the control of Phytophthora root rot.

## Materials and Methods...

### Efficacy of foliar phosphonate formulations

The field research in this project was carried out using 'Hass' trees on several commercial avocado properties located in New South Wales, Queensland, and Western Australia.

#### Durambah

Three-year-old 'Hass' trees with no previous history of phosphonate treatment growing in

a commercial orchard at Durambah, NSW were chosen for phosphonate studies during 1998/99. The trees were growing on a replant site that was infested with *Phytophthora cinnamomi* and had been treated in previous years with Ridomil®. At the time of the first phosphonate treatment the trees were approximately 1.2 m tall and had set a light crop of fruit and were in good health (rating between 0-2 on the health scale of 0-10 where 0 = healthy and 10 = dead). Trees were treated with seven foliar sprays of either 0.1, 0.5 or 1.0% phosphonate from the 12<sup>th</sup> Nov 98 to the 3<sup>rd</sup> Jun 99. The trunk-injection treatment was given on the 12<sup>th</sup> Nov 98 and the 12<sup>th</sup> Feb 99. Phosphonate sprays were applied to trees as a tank mix combined with standard industry pesticides. These included copper hydroxide (Blueshield® DF) at 2 g.L<sup>-1</sup>, copper oxychloride (Barmac® Copper Oxychloride) at 4 g.L<sup>-1</sup> and endosulfan (Endosulfan® 350 EC) at 1.5 mL.L<sup>-1</sup>. No surfactants were used with these treatments and trees were sprayed to the point of run-off (1.5 L.tree<sup>-1</sup>). Worm casts were also applied in another treatment to assess their ability to control Phytophthora root rot. The experimental design was six treatments using single tree plots that were replicated five times in a randomised layout. Data were analysed by ANOVA.

The study was repeated during the 1999/00 season using the same trees. However, the worm cast treatment was discontinued and Bion (a plant defence-enhancing agent) combined with phosphonate was added to the treatments. Foliar treatments were applied three times over the summer months: on the 14<sup>th</sup> Dec 99, the 15<sup>th</sup> Feb 00 and the 29<sup>th</sup> Mar 00. Trunk injections were given to the trees on the 14<sup>th</sup> Dec 99 and the 15<sup>th</sup> Feb 00. No other chemicals were combined with the treatments and no surfactants were used. Trees were sprayed to the point of run-off (about 2 L.tree<sup>-1</sup>). The experimental design was six treatments using single tree plots that were replicated five times in a randomised layout. Data were analysed by ANOVA.

#### Childers

In Dec 99 a field experiment was started in a commercial orchard at Childers, QLD

using 17-year-old 'Hass' trees with varying levels of decline due to Phytophthora root rot. The health of trees was rated on a 0-10 scale (where 0 = healthy and 10 = dead) immediately before treatments were imposed. Tree health was rated again on the 5<sup>th</sup> Aug 00. The foliar treatments of either 0.1, 0.25, 0.5 or 1.0% phosphonate were applied three times over the growing season: on the 30<sup>th</sup> Nov 99, the 28<sup>th</sup> Jan 00 and the 31 Mar 00. Bion was added to the 0.25 and 0.5% phosphonate treatments. Applications were made using a Stihl backpack, mist blower unit to the point of run-off (about 9 L.tree<sup>-1</sup>). Trunk injections were given to trees using Chemjet® syringes on the 30<sup>th</sup> Nov 99 and the 28<sup>th</sup> Jan 00. The experiment had seven treatments that were replicated five times in a randomised block layout. Data were analysed by ANOVA.

#### Pemberton

In March 1998 a field experiment was begun in a commercial orchard at Pemberton, WA using 'Hass' trees that had reached an advanced state of decline due to Phytophthora root rot. The experiment had four treatments that were replicated six times with 15 tree plots in a randomised block design. Data was analysed by ANOVA. The treatments were:

1. Trunk injection twice per season at the standard industry rate using 20% phosphonate.
2. Trunk injection twice per season at the standard industry rate using 40% phosphonate with the pH adjusted to 7.2.
3. Trees foliar sprayed (high volume) with a 1% phosphonate formulation adjusted to pH 7.2. The sprays were applied 3-4 weeks apart during the spring and summer.
4. Trees stag-horned back to about 1 m above the ground and the regrowth sprayed as above.

The health of trees was rated on a 0-10 scale (where 0 = healthy and 10 = dead) immediately before treatments were imposed (4<sup>th</sup> Mar 98). Some trees rated as high as 9 and 65% of the trees were rated 5. Tree health was rated again on the 23<sup>rd</sup> Mar 99 (27% of trees rated 5), the 15<sup>th</sup> Nov 99

(8% of trees rated 5), the 12<sup>th</sup> May 00 and the 25<sup>th</sup> Oct 00. Individual tree yields were not collected in 1998 but were recorded in 1999 from the first complete crop cycle following the start of treatments in 1999 and again in 2000. In the first year of the experiment the 1.0% foliar sprays were applied six times from the 27<sup>th</sup> Dec to the 24<sup>th</sup> May. In the second year of the experiment the foliar spray concentration was reduced to 0.5% a.i. phosphonate and was applied three times during the summer.

#### **Phytotoxicity of foliar-applied phosphonate fungicides**

The registration for foliar-applied, mono-dipotassium phosphonate currently used by the avocado industry is a 0.1% formulation that is applied at a pH of 5.8-6.0. The two new formulations tested in this program were 0.5% and 1.0% mono-dipotassium phosphonate. Phytotoxicity studies were conducted in a commercial orchard at Childers with branches of non-fruiting 'Hass' trees sprayed with the 1% formulation adjusted to the pHs of 6.8, 7.0, 7.2, 7.4 and 7.6. In addition, the formulation was tested as a tank spray with pesticides commonly used by industry (copper hydroxide, copper oxychloride and endosulphane). Sprays were applied to trees in the morning and evening and the leaves rated for burn within seven days of application. In addition, foliar phosphonate was applied at 0.5% and 1.0% buffered to a pH of 7.2, with or without the surfactants Agral® (at 0.1 and 0.2%) and Nufilm® (at 0.05 and 0.2%) and in combination with copper hydroxide or copper oxychloride. Leaves on treated branches were evaluated for burn within seven days of treatment.

Phytotoxicity was also noted where it occurred in the efficacy and fruit residue experiments at Maleny (QLD) and Duranbah (NSW).

**Table 1:** Effect of worm casts and foliar-applied and trunk-injected phosphonate on root health of 'Hass' avocado trees at Duranbah. Root health data were collected on the 10<sup>th</sup> Mar 99 by estimating the percentage of root tips that were free of disease. Data are mean values of five trees. Values in columns followed by different superscript letters are significantly different ( $P < 0.05$ ) as tested by ANOVA.

Treatments*	% healthy roots
Untreated	59.5 <sup>b</sup>
Worm castings	41.0 <sup>b</sup>
Foliar PO <sub>3</sub> @ 0.1% + Cu hydroxide + endosulphane	89.4 <sup>a</sup>
Foliar PO <sub>3</sub> @ 0.5% + Cu oxychloride + endosulphane	79.0 <sup>a</sup>
Foliar PO <sub>3</sub> @ 1.0% Cu oxychloride + endosulphane	85.0 <sup>a</sup>
Trunk-injected PO <sub>3</sub>	88.0 <sup>a</sup>

\*Worm casts were applied at the rate of 5 L.m<sup>-2</sup> under the tree canopy on the 12<sup>th</sup> Nov 1998. Foliar sprays of phosphonate were applied on the 12<sup>th</sup> Nov 98, 10<sup>th</sup> Dec 98, 7<sup>th</sup> Jan 99 and 12<sup>th</sup> Feb 99. Trunk injections of phosphonate were given on the 12<sup>th</sup> Nov 98 and the 12<sup>th</sup> Feb 99 at the rate of 15 mL.m<sup>-1</sup> diameter of tree canopy.

#### **Application technology**

This experiment was designed to evaluate the effectiveness of low and high volume foliar applications of 0.5% phosphonate on small and large trees. The experiment was carried out on 7 and 11-year-old 'Hass' trees planted at 9 x 9 m in a commercial orchard at Hampton, QLD. Low volume applications were applied with a CDA applicator using 'micromaster' heads. This gave an application rate of 3 L.tree<sup>-1</sup> (15 g.tree<sup>-1</sup> of phosphonic acid) on small trees and 5 L.tree<sup>-1</sup> (25 g.tree<sup>-1</sup> of phosphonic acid) on large trees. The high volume sprays were applied with a Stihl backpack misting unit and trees sprayed to run-off. This equated to an application rate of 6 L.tree<sup>-1</sup> (30 g.tree<sup>-1</sup> of phosphonic acid) on small trees and 12 L.tree<sup>-1</sup> (60 g.tree<sup>-1</sup> of phosphonic acid) on large trees. An additional treatment of two low volume foliar applications seven days apart was given to the large trees.

In each case roots samples were collected for phosphonic acid analysis 14 days after the last application. The first foliar spray was applied to trees at spring flush maturity (1<sup>st</sup> Dec 99) and the treatments repeated beginning on the 23<sup>rd</sup> Mar 00 (summer flush maturity).

#### **Fruit phosphonic acid residues**

The experimental site to collect withholding data was a commercial orchard at Maleny, south east Queensland. Thirteen-year-old 'Hass' trees with no previous history of phosphonate treatment were chosen for the study. Trees were stumped in 1996 and were carrying their first commercial crop following regrowth (50 to 160 kg of fruit per tree). At the time of treatment the experimental trees were approximately 4.5 m in diameter and 4.2 m tall. The

experimental design was a 3 (spray concentrations) x 5 (sample times) factorial replicated twice in a complete randomised block layout. Data was analysed as a two-way randomised block using ANOVA (Genstat 5) and judged for significance at  $P < 0.05$ .

When fruit reached commercial maturity (about 25% dry matter) trees were sprayed with mono-dipotassium phosphonate at either 0.5 or 1.0% using 4-5 litres of formulation per tree. Approximately 2 kg of fruit (8) were collected from each tree to determine phosphonate residue levels 2 h and 1, 3, 7 and 14 days after spraying. Each sample was placed in a polythene bag that was identified with a unique sample description number. Samples were placed in a freezer at approximately -20°C prior to analysis.

### **Results and Discussion ...**

#### *Development of foliar phosphonate formulations to control Phytophthora root rot*

##### **Duranbah**

At Duranbah the health of trees in the first year of the experiment was evaluated in Mar 99 (Table 1) and Jul 99 (Table 2) while in the second year health was rated in Dec 99, May 00, Sep 00 and Nov 00 (Table 3).

Four months after beginning the experiment all phosphonate treatments had significantly ( $P < 0.05$ ) improved root health when compared to untreated trees and those trees where worm casts were used (Table 16).

A further health rating eight months following the commencement of spraying phosphonate showed that the treatments continued to provide control of Phytophthora root rot (Table 2). Root mass was significantly ( $P < 0.05$ ) greater for phosphonate treated trees when compared to those that had worm castings while the percentage of healthy roots was significantly greater for trees sprayed with 0.5 or 1.0% phosphonate or trunk-injected with phosphonate when compared to untreated trees. While there was no significant difference in the rating of tree health as judged by the canopy, there was a general trend for trees to be healthier when sprayed with 0.5 or 1.0% phosphonate or trunk-injected with phosphonate (Table 2). Canopy ratings for tree health are best made at the completion of flowering (October) when maximum stress has been applied to the trees as this is when differences between root systems are maximised.

The improvement in tree root health following foliar-applied 0.5 and 1.0% phosphonate as well as trunk-injected phosphonate was during a year of extreme disease pressure when in excess of 3250 mm of rain was recorded at the site. This is viewed as a good result for these new

formulations which on young trees tended to be superior to the registered 0.1% phosphonate application.

When ratings were resumed in the second year of the experiment (Dec 99) there was an overall decline in tree health across all treatments when compared with the ratings

**Table 2:** Effect of worm casts and foliar-applied and trunk-injected phosphonate on root mass, root health and tree health of 'Hass' avocado trees at Duranbah. Root mass, root health and tree health data were collected on the 27<sup>th</sup> Jul 99. Root mass was estimated using a 0-3 rating system where 0 = low and 3 = high; root health was estimated as the percentage of root tips that were free of disease; tree health was estimated on a 0-10 scale where 0 = healthy and 10 = dead. Data are mean values of five trees. Values in columns followed by different superscript letters are significantly different ( $P < 0.05$ ) as tested by ANOVA.

Treatments*	Root mass (1-3)	% healthy roots**	Tree health (0-10)
Untreated	1.7 <sup>ab</sup>	50.0 <sup>b</sup>	2.8 <sup>a</sup>
Worm casts	1.3 <sup>b</sup>	74.5 <sup>ab</sup>	3.8 <sup>a</sup>
Foliar PO <sub>3</sub> @ 0.1%	2.3 <sup>a</sup>	73.0 <sup>ab</sup>	2.0 <sup>a</sup>
Foliar PO <sub>3</sub> @ 0.5%	2.5 <sup>a</sup>	91.0 <sup>a</sup>	1.6 <sup>a</sup>
Foliar PO <sub>3</sub> @ 1.0%	2.3 <sup>a</sup>	90.0 <sup>a</sup>	1.6 <sup>a</sup>
Trunk-injected PO <sub>3</sub>	2.5 <sup>a</sup>	85.0 <sup>a</sup>	1.0 <sup>a</sup>

\*Worm casts were applied at the rate of 5 L.m<sup>-2</sup> under the tree canopy on the 12<sup>th</sup> Nov 1998. Foliar applications of phosphonate were applied on the 12<sup>th</sup> Nov 1998; 10<sup>th</sup> Dec 1998; 7<sup>th</sup> Jan 1999; 12<sup>th</sup> Feb 1999; 10<sup>th</sup> Mar 1999; 14<sup>th</sup> Apr 1999 and the 3<sup>rd</sup> Jun 1999. Trunk injections of phosphonate were given on the 12<sup>th</sup> Nov 98 and the 12<sup>th</sup> Feb 99 at the rate of 15 mL.m<sup>-1</sup> diameter of tree canopy.

\*\*Significant at  $P < 0.09$ .

**Table 3:** Effect of foliar and trunk-injected phosphonate (PO<sub>3</sub>) applications on the health of 'Hass' trees at Duranbah during 1999/00. Health ratings were scored on a 0-10 scale (0 = healthy and 10 = dead). Data in columns are mean values of 5 trees and was analysed by ANOVA with differences judged at ( $P \leq 0.05$ ). There were no significant differences between treatments at any of the times that trees were rated.

Treatments	Health ratings			
	14 Dec 99	18 May 00	27 Sep 00	16 Nov 00
Control	4.2	2.2	2.8	2.9
Foliar PO <sub>3</sub> @ 0.1% a.i.	4.2	1.8	2.4	2.8
Foliar PO <sub>3</sub> @ 0.25% a.i. + 0.05 g.L <sup>-1</sup> Bion	4.8	3.6	3.8	3.6
Foliar PO <sub>3</sub> @ 0.5% a.i.	4.0	2.6	3.6	2.6
Foliar PO <sub>3</sub> @ 0.5% a.i. + 0.05 g.L <sup>-1</sup> Bion	4.6	3.8	4.6	3.8
Foliar PO <sub>3</sub> @ 1.0% a.i.	3.8	1.4	2.4	1.4
Trunk-injected PO <sub>3</sub> at commercial rate	3.8	3.2	3.4	3.2

**Table 4:** Comparison between untreated, trunk-injected and foliar-sprayed phosphonate with or without Bion on the recovery in health of 'Hass' avocados at Childers, Qld. Trees were rated for health on a 0-10 scale (where 0 = healthy and 10 = dead) prior to treatments being applied (Nov 99). Values in columns are means of 5 trees and those followed by different letters are significantly different at  $P < 0.05$ .

Treatments*	Tree health ratings (0-10)		Health improvement
	23 <sup>rd</sup> Nov 99	5 <sup>th</sup> Aug 00	
Control	2.8 <sup>a</sup>	5.6 <sup>a</sup>	-2.8 <sup>a</sup>
Foliar phosphonate @ 0.1% a.i.	4.0 <sup>a</sup>	4.4 <sup>ab</sup>	-0.4 <sup>b</sup>
Foliar phosphonate @ 0.25% a.i. + Bion	4.6 <sup>a</sup>	3.0 <sup>bc</sup>	1.6 <sup>c</sup>
Foliar phosphonate @ 0.5% a.i.	4.0 <sup>a</sup>	2.4 <sup>c</sup>	1.6 <sup>c</sup>
Foliar phosphonate @ 0.5% a.i. + Bion	4.0 <sup>a</sup>	3.0 <sup>bc</sup>	1.0 <sup>c</sup>
Foliar phosphonate @ 1.0% a.i.	4.2 <sup>a</sup>	2.6 <sup>c</sup>	1.6 <sup>c</sup>
Trunk injection	4.0 <sup>a</sup>	2.8 <sup>c</sup>	1.2 <sup>c</sup>

in Jul 99 (Table 3). Throughout the year the health of trees in all treatments generally improved but at each time the ratings were taken there was no significant difference between treatments. This was a "normal" rainfall year at this site and it is likely that other management factors together with the deep, well-drained soil and the light crop being carried by the trees contributed to the improvement in health irrespective of whether trees had been treated with fungicide or left untreated.

### Childers

At the start of experiment the control trees on average rated amongst the healthiest however, without treatment the decline in health was significantly greater than all other treatments (Table 4). All foliar phosphonate treatments of 0.25% a.i. or greater concentration improved tree health over the duration of the experiment as did trunk-injected phosphonate. However, there was no significant difference between these treatments on their effect on tree health. The 0.1% foliar phosphonate treatment resulted in a decline in tree health over the duration of the study.

The trees at the Childers site set and carried a significant commercial crop over the duration of the study and hence are representative of mature, bearing orchards across Australia. With trees carrying commercial crops of fruit there is a reduced availability of tree resources for root growth (Whiley, 1994) thus limiting the ability of the tree to replace roots damaged by *Phytophthora* root rot. Hence, damage by *Phytophthora cinnamomi* is potentially much greater than in young orchards which have not reached their cropping capacity. In this study, three sprays of 0.1% foliar-applied phosphonate at six-weekly intervals was not sufficient to control the disease with the treated trees suffering a further decline in health over the duration of the experiment. However, all foliar-applied phosphonate treatments of 0.25% phosphonate improved tree health and gave a similar result to the registered trunk injection procedure. This result supports the anecdotal observations that the foliar-applied 0.1% phosphonate treatment is insufficient to maintain or improve tree health although the registered method for the use of this formulation is for greater application frequency. The reduced application frequency of higher concentration phosphonate formulations will have significant cost savings for avocado growers while maintaining or improving tree health.

**Table 5:** Comparison between trunk-injected and foliar-sprayed mono-dipotassium phosphonate on the recovery in health of 'Hass' avocados at Pemberton, WA. Trees were rated for health on a 0-10 scale (0 = healthy and 10 = dead) prior to treatments being applied (Mar 98). Values in columns are means of 75 trees and those followed by different letters are significantly different at  $P < 0.05$  as tested by ANOVA.

Treatments	Mar 98	Mar 99	Nov 99	May 00*	Oct 00
Trunk-injected with 20% phosphonate at pH 5.6	5.3 <sup>a</sup>	3.9 <sup>a</sup>	1.9 <sup>b</sup>	1.0 <sup>b</sup>	1.6 <sup>b</sup>
Trunk-injected with 40% phosphonate at pH 7.2	5.3 <sup>a</sup>	3.8 <sup>a</sup>	1.6 <sup>b</sup>	1.4 <sup>ab</sup>	1.8 <sup>b</sup>
Foliar-sprayed 0.5 or 1% phosphonate at pH 7.2	5.3 <sup>a</sup>	4.1 <sup>a</sup>	2.5 <sup>a</sup>	1.7 <sup>a</sup>	2.7 <sup>a</sup>
Pruned: regrowth foliar-sprayed with 0.5 or 1% phosphonate at pH 7.2	5.2 <sup>a</sup>	0.6 <sup>b</sup>	0.9 <sup>c</sup>	0.3 <sup>c</sup>	0.7 <sup>c</sup>
<b>Means</b>	<b>5.3</b>	<b>3.1</b>	<b>1.7</b>	<b>1.1</b>	<b>1.7</b>

### Pemberton

There was improved tree health across all treatments during the first year of the experiment with further improvements being made by Nov 99 (Table 5). The two trunk injection treatments gave a similar result despite twice the amount of active ingredient being used in the 40% formulation. The 1% foliar spray without pruning was the least effective treatment but it still gave a considerable improvement in health over the 20 month period (health rating from 5.3 to 2.5). The health of trees in this treatment further improved through to May 00 despite the phosphonate application being reduced to 0.5% a.i. and applied at six weekly intervals three times during the summer. However, by Oct 00 the health of these trees had declined. The most effective treatment on tree health was where trees were stag-horned and the regrowth sprayed with 0.5 or 1% phosphonate (Table 5).

With respect to tree yield there was no significant difference between either of the trunk injection treatments or the foliar spray application where trees were not pruned. Mean fruit yields on these trees ranged from 13.5-16.3 t ha<sup>-1</sup> (98/99) or 27-32.5 kg tree<sup>-1</sup> (99/00). However, there was a significant and severe reduction in yield where trees were stag-horned prior to foliar spraying over the two years of the experiment (Table 6).

The health rating was directly correlated to crop load where the higher the yield the poorer the health rating of the tree. This is expected, as fruit will compete more strongly than roots for tree resources hence roots are not repaired as quickly on trees with high crop loads.

The use of foliar-applied phosphonate sprays of firstly 1.0% and then 0.5% at Pemberton also demonstrated the ability of higher concentration formulations to improve tree health with the treatment giving similar results to trunk injection. However, there was some indication that three sprays of 0.5% phosphonate was insufficient in a heavy cropping year (99/00) as the health of trees

**Table 6:** Comparison between trunk-injected and foliar-sprayed mono-dipotassium phosphonate on the yield of 'Hass' avocados at Pemberton, WA during a health recovery phase. Values in columns are means of 75 trees and those followed by different letters are significantly different at  $P < 0.05$  as tested by ANOVA.

Treatments	Yield (kg tree <sup>-1</sup> )		
	98/99	99/00	Cumulative
Trunk-injected with 20% phosphonate at pH 5.6	32.5 <sup>a</sup>	77.1 <sup>a</sup>	109.6 <sup>a</sup>
Trunk-injected with 40% phosphonate at pH 7.2	29.3 <sup>a</sup>	86.5 <sup>a</sup>	115.9 <sup>a</sup>
Foliar-sprayed 0.5 or 1% phosphonate at pH 7.2	*27.0 <sup>a</sup>	**81.3 <sup>a</sup>	108.2 <sup>a</sup>
Pruned: regrowth foliar-sprayed with 0.5 or 1% phosphonate at pH 7.2	*0.1 <sup>b</sup>	**43.1 <sup>b</sup>	43.2 <sup>b</sup>
<b>Means</b>	<b>22.2</b>	<b>72.0</b>	<b>94.2</b>

\*Sprayed with 1% phosphonate at pH 7.2; \*\*Sprayed with 0.5% phosphonate at pH 7.2.

**Table 7:** Phytotoxic effects of 1% phosphonate sprays on 'Hass' leaves at Childers. Leaf burn was rated on a 0-5 scale where 0 = no burn and 5 = extensive burn. Data are mean values of ratings from 12 trees. Values in columns followed by different superscript letters are significantly different ( $P \leq 0.05$ ) as tested by ANOVA.

pH treatments*	Pesticide combinations		
	Phosphonate	Phosphonate + copper hydroxide + endosulphur	Phosphonate + copper oxychloride + endosulphur
6.8	2.00 <sup>a</sup>	2.00 <sup>a</sup>	1.58 <sup>a</sup>
7.0	1.33 <sup>bc</sup>	1.75 <sup>a</sup>	1.42 <sup>a</sup>
7.2	0.83 <sup>c</sup>	1.75 <sup>a</sup>	1.08 <sup>a</sup>
7.4	1.42 <sup>abc</sup>	1.58 <sup>ab</sup>	1.42 <sup>a</sup>
7.6	1.67 <sup>ab</sup>	1.25 <sup>b</sup>	1.42 <sup>a</sup>

\*The pH of the phosphonate solution was adjusted through the addition of potassium hydroxide.

declined when compared to those trunk-injected with phosphonate and having a similar cropping profile. Trees that were stag-horned then treated with foliar phosphonate maintained the best health of all treatments but carried significantly less fruit for the duration of the study. This further highlights the interaction between crop load, phosphonate treatment and tree health.

### Phytotoxicity of foliar-applied phosphonate fungicides

Results from the evaluation of 1% phosphonate sprays at Childers that were buffered to different pH values showed that

phytotoxicity (leaf burn) was related to the pH of the formulation applied to the trees. Where phosphonate was used without any other pesticides there was significantly ( $P < 0.05$ ) less damage when the formulation was adjusted to pH 7.2 (Table 7). When phosphonate was combined with copper hydroxide plus endosulphur the formulation with a pH of 7.6 gave significantly ( $P < 0.05$ ) less damage than the same pesticide combination at other pHs. There was a trend for the pH 7.2 formulation to give the least damage when phosphonate was combined with copper oxychloride and endosulphur (Table 7). A rating of  $\leq 1$  was commercially acceptable.

**Table 8:** Phosphonic acid concentration ( $\text{mg} \cdot \text{kg}_{\text{fw}}^{-1}$ ) in roots of 'Hass' avocado trees at Hampton 14 days after a foliar spray of 0.5% mono-dipotassium phosphonate (pH 7.2). The foliar sprays were applied on the 1<sup>st</sup> Dec 99 (spring) and the 23<sup>rd</sup> Mar 00 (summer). For trees receiving two low volume applications the second spray was applied 7 days after the first spray. Data in columns are mean values from five trees  $\pm$  standard errors.

Treatments*	Phosphonate applied (g.tree <sup>-1</sup> )	Spring applied	Summer applied	
			Before	After
<i>Small trees (7-years-old)</i>				
Untreated	-	1.0 $\pm$ 1.0	1.3 $\pm$ 1.3	NDR
Low volume (3 L.tree <sup>-1</sup> )	15	4.8 $\pm$ 1.0	3.7 $\pm$ 0.4	14.3 $\pm$ 3.2
High volume (6 L.tree <sup>-1</sup> )	30	8.3 $\pm$ 1.6	8.6 $\pm$ 2.1	18.6 $\pm$ 2.1
<i>Large trees (11-years-old)</i>				
Untreated	-	4.3 $\pm$ 1.0	4.2 $\pm$ 0.3	3.6 $\pm$ 1.7
Low volume (5 L.tree <sup>-1</sup> )	25	7.9 $\pm$ 0.7	4.2 $\pm$ 1.2	12.8 $\pm$ 1.0
Low volume x 2 (10 L.tree <sup>-1</sup> )	50	11.6 $\pm$ 1.5	9.4 $\pm$ 1.8	20.5 $\pm$ 5.8
High volume (12 L.tree <sup>-1</sup> )	60	21.1 $\pm$ 3.0	7.9 $\pm$ 2.4	30.7 $\pm$ 5.1

\*Low volume treatments were applied with a CDA applicator while high volume treatments were applied with a Stihl backpack mist-blower unit.

**Table 9:** Phosphonic acid concentrations ( $\text{mg} \cdot \text{kg}_{\text{fw}}^{-1}$ ) measured in avocado fruit following foliar applications of 0.5 and 1.0% potassium phosphonate solutions at 0.08, 1, 3, 7 and 14 days after treatment. Data in columns are mean values ( $n = 5$  or 6). Statistical analysis were by two-way ANOVA and there were no significant ( $P < 0.05$ ) differences in fruit phosphonate residues between the different foliar spray concentrations or the time after spraying that fruit were collected.

Concentration of Foliar Application			Time after foliar application (days)				
0	0.5%	1.0%	0.08	1	3	7	14
0.05	3.62	3.85	2.87	2.82	2.73	1.83	2.28

**Table 10:** Phosphonic acid residues ( $\text{mg} \cdot \text{kg}_{\text{fw}}^{-1}$ ) measured in avocado fruit following foliar applications of 0.5 and 1.0% potassium phosphonate solutions at 0.08, 1, 3, 7 and 14 days after treatment. Data in columns are mean values ( $n = 2$ ). Statistical analysis was by two-way ANOVA and there were no significant ( $P < 0.05$ ) interactions between treatments.

Foliar concentration (%)	Time after foliar application (days)				
	0.08	1	3	7	14
0	0.25	0	0	0	0
0.5	4.05	4.15	3.40	2.80	3.70
1.0	4.30	4.30	4.80	2.70	3.15

In other experiments at Childers it was shown that there was minimal phytotoxicity from 0.5% phosphonate sprays where the formulation was adjusted to a pH of 7.2 but the addition of Agral® or Nufilm® significantly increase the risk of phytotoxicity (either leaf burn and/or leaf drop) (data not presented). It was also found that there were less phytotoxic symptoms when trees were sprayed during the morning compared with spraying in the evening (data not presented).

At Maleny the 1% phosphonate + copper hydroxide + endosulphan formulation resulted in leaf burn following the 2<sup>nd</sup> spray. The burn was not commercially acceptable so the treatment was discontinued at this site. Phytotoxicity from the other treatments was

minimal and within commercial tolerances. At Duranbah, some leaf burn occurred on most treatments following the 1<sup>st</sup> and 3<sup>rd</sup> sprays given to trees. The burn was more severe from the 1.0% sprays compared to the 0.5% sprays. The leaf burn was more severe than what was observed at Maleny and may be due to the high volume application of treatments at the Duranbah site or the higher day temperatures reached at the coastal site. It was decided to cease application of phosphonate with other pesticides until the issue of phytotoxicity was resolved and there was no further leaf burn recorded on these trees for the rest of the season with foliar phosphonate being applied alone to the trees.

#### Application technology

Root phosphonic acid concentrations in small trees were 4.8 and 8.3  $\text{mg} \cdot \text{kg}_{\text{fw}}^{-1}$  for low and high volume applications, respectively (Table 8). Root concentrations in the large trees were higher at 7.9 and 21.1  $\text{mg} \cdot \text{kg}_{\text{fw}}^{-1}$  for low and high volume applications, respectively and 11.6  $\text{mg} \cdot \text{kg}_{\text{fw}}^{-1}$  in those trees receiving two low volume applications one week apart. However, the base level of phosphonic acid from previous treatments was higher in the large trees (1.0 vs 4.3  $\text{mg} \cdot \text{kg}_{\text{fw}}^{-1}$ ). The root concentration in small trees that had received the high application rate was lower than expected and is likely due to the extremely heavy crop load that these trees were carrying at the time of treatment as young fruit are very strong sinks.

Following the summer treatment, root phosphonic acid concentration in small trees was 14.3 and 18.6  $\text{mg} \cdot \text{kg}_{\text{fw}}^{-1}$  for low and high volume applications, respectively (Table 8). Root phosphonic acid concentrations in the large trees were 12.8 and 30.7  $\text{mg} \cdot \text{kg}_{\text{fw}}^{-1}$  for low and high volume applications, respectively and 20.5  $\text{mg} \cdot \text{kg}_{\text{fw}}^{-1}$  in those trees receiving two low volume applications one week apart. As root phosphonic acid concentrations were still comparatively low in small trees following the summer application it is likely that the very heavy crop retained by these trees was still limiting redistribution to the weaker sinks.

In large trees the results showed that the high volume application was effective in increasing the root phosphonic acid concentration to greater than 20  $\text{mg} \cdot \text{kg}_{\text{fw}}^{-1}$  but a single low volume application was not sufficient (Table 8). This is not surprising

since 60 g of phosphonic acid was applied to trees receiving the high volume application while only 25 g of phosphonic acid was applied to the same size trees receiving low volume application. Repeating the low volume application was effective in increasing the root phosphonic acid concentration but still had only 55-67% of the efficiency of high volume applications.

#### Fruit phosphonic acid residues

Data on mean residue concentrations of phosphonic acid in fruit are reported in Table 9. Phosphonic acid residues were highest in fruit from trees treated with the 0.5 and 1% phosphonate formulations (3.62 and 3.85 mg.kg<sub>fw</sub><sup>-1</sup>, respectively) however, there was no significant difference between treatments. Mean phosphonic acid concentrations of fruit harvested at different times after foliar treatment were not significantly different with time and ranged from 1.83 to 2.87 mg.kg<sub>fw</sub><sup>-1</sup> (Table 9).

The range of phosphonic acid residue concentrations across treatments was 0-4.8 mg.kg<sub>fw</sub><sup>-1</sup> and values for each treatment combination are presented in Table 10. There were no significant interactions between treatments.

#### Conclusions...

The results from the phosphonate fungicide research reported in this paper indicate the following:

1. Foliar application of 0.5% phosphonate applied up to eight times per growing season from spring flush maturity (November) through to summer flush maturity (May) will give commercial control of Phytophthora root rot in mature fruiting trees with minimum risk of phytotoxicity. The number of applications required will vary with location, season and crop load and may be monitored through using a commercial phosphonic acid root analysis service;
2. Apply the phosphonate fungicide without the use of a wetting agent or spreader and do not mix with other pesticides;
3. Only use copper oxychloride for anthracnose control (increased risk of phytotoxicity if copper hydroxide is present on the leaves of trees when foliar treated with phosphonate fungicide);
4. Apply the phosphonate fungicide with the pH of the tank mix adjusted to 7.2 (note: most farm water will reduce the pH of the tank mix if using a phosphonate fungicide buffered to 7.2);

5. Know the characteristics of your spray applicator as it is the grams a.i. of phosphonate that are sprayed on the canopy with each treatment that is important with respect to increasing root phosphonic acid levels;
6. Treatment of trees with phosphonic acid at spring and summer flush maturity are the two most effective times in relation to increasing root phosphonic acid concentrations. All other treatment times will give significantly lower increases in the root phosphonic acid levels;
7. Treatment of trees at fruit maturity increased fruit phosphonic acid levels by <5 mg/kg, which is negligible in relation to allowable fruit residues.

*Note: at the time of writing this paper an application was being prepared to support the registration of the foliar application of mono-dipotassium phosphonate at 0.5% a.i. for use on avocados. The only registration currently approved for foliar phosphonate application is for the application of 0.1% a.i. mono-dipotassium phosphonate.*

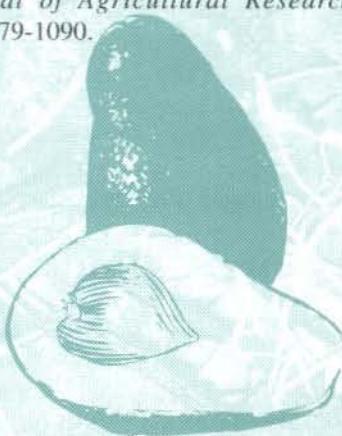
*Ed Note: This paper was presented at the Australian and New Zealand Conference held last year. To Date, there has been no registration of the foliar application mentioned.*

#### Acknowledgments...

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# THE AUSTRALIAN GENE TECHNOLOGY REGULATORY SYSTEM

On 21 June 2001, the Gene Technology Act 2000 (the Act) took effect. The Act underpins Australia's first national regulatory system for gene technology, which is designed to:

*"protect the health and safety of people, and the environment, by identifying risks posed by or as a result of gene technology, and to manage those risks by regulating certain dealings with genetically modified organisms."*

The national regulatory system was developed through extensive consultation with the Australian community, including through public meetings. This scheme:

- Prohibits dealings with GMOs (e.g. research, manufacture, production, propagation and import) unless the dealing is licensed or is exempt or a notifiable low risk dealing as set out in the *Gene Technology Regulation 2001* (the Regulations); and
- Establishes a statutory officer, the gene Technology Regulator (the Regulator), to administer the legislation and make decisions under the legislation (including the issuing of licences).

The Office of the Gene Technology Regulator, which supports the Regulator, is part of the Therapeutic Goods Administration of the Department of Health and Ageing. All dealings that involve the intentional release of a GMO into the environment (DIRs) must be licensed by the Regulator. The DIR category covers work ranging from limited releases (field trials) as the initial stages of research and development through to work to which minimal conditions apply (commercial release).

The initial limited releases are carried out in the open environment on a restricted scale and for a limited period, under conditions that minimize the potential for spread of the GMO. They are conducted in order to obtain information on the performance of a GMO, its interaction with the environment, and an increased understanding of appropriate risk management strategies. As more knowledge is gained about the potential risks, releases may or may not be approved with less stringent conditions. Commercial releases allow for the sale and general distribution and use of a GMO, however regional and other licence restrictions can still be placed on the release.

While Australia's regulatory system commenced on the 21 June 2001, it was preceded by a voluntary system of controls, which operated for around 15 years. Under the voluntary system, a range of GMOs (including some GM canola) were released into the Australian environment, following consideration of the risks they posed by the Genetic Manipulation Advisory Committee.

## Public feedback on releases into the environment involving GMOs...

At almost every public meeting held during the development of the regulatory system, and in much of the written correspondence received, a number of key messages kept on coming through. On the subject of releases into the environment involving GMOs, many people:

- Emphasized that they particularly wanted to know more about what was happening in Australia when it comes to using GMOs in release into the environment situations;

- Asked to ensure that they had as much information about releases into the environment as possible; and
- Wanted Australia to have a system that allowed them to have input into assessment of applications relating to releases into the environment, and to see how their input was taken into account in the decision making process.

## An inclusive and transparent regulatory system...

All State, territory and commonwealth governments worked cooperatively to develop a nationally consistent regulatory system for gene technology. Feedback from the Australian community was taken seriously and ensured that the system:

- Makes extensive information about applications available to anyone who is interested;
- Offers opportunities for public input into regulatory system; and
- Is transparent, so that people can see what comments were generated through the consultation, and how issues raised have been addressed.

## The Regulator must assess the application and make a decision...

The Act sets out a clear process that the regulator must follow in assessing each application and making a decision whether to approve it. As part of this process, there is consultation with:

- All State and Territory Governments;
- Relevant local council(s);
- Commonwealth Departments and agencies including Agriculture, Fisheries and Forestry Australia, Environment Australia, the Australian Quarantine and Inspection Service, Food Standards Australia New Zealand, the National Registration Authority, the Therapeutic Goods Administration, the Department of Foreign Affairs and Trade, and the Department of Industry, Tourism and Resources;
- The Commonwealth Environment Minister; and
- The Gene Technology Technical Advisory Committee.

This consultation enables the preparation of a risk assessment and risk management plan. In accordance with the Act, the risk assessment and risk management plan focuses on identifying risks to public health and to the environment posed by an application. The Act requires that a risk assessment based on scientific data be undertaken.

For more information write to –

The Office of Gene Technology Regulator,

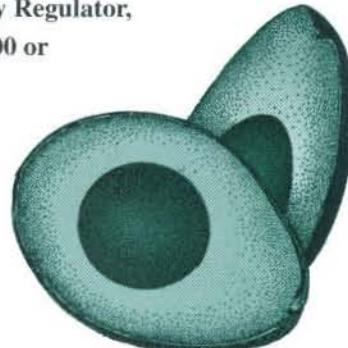
PO Box 100, Woden ACT 2600 or

Phone: 1800 181 030,

Fax: 02 6271 4202,

Email: [ogtr@health.gov.au](mailto:ogtr@health.gov.au),

Website: [www.ogtr.gov.au](http://www.ogtr.gov.au)





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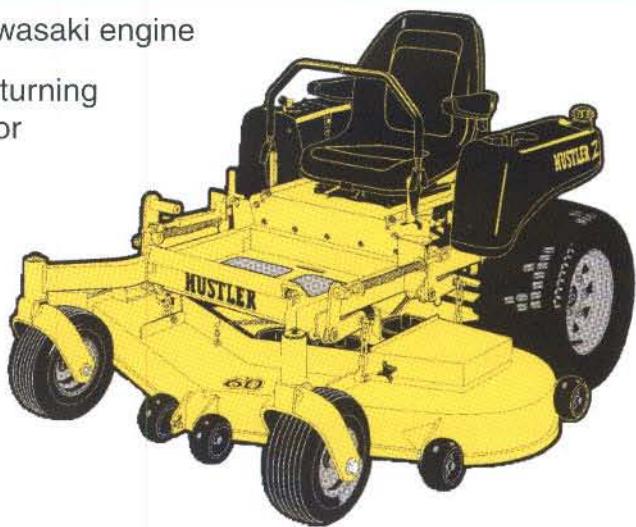
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