AUSTRALIAN AVOCADO GROWERS' FEDERATION INC

Talking Avocados

AHC

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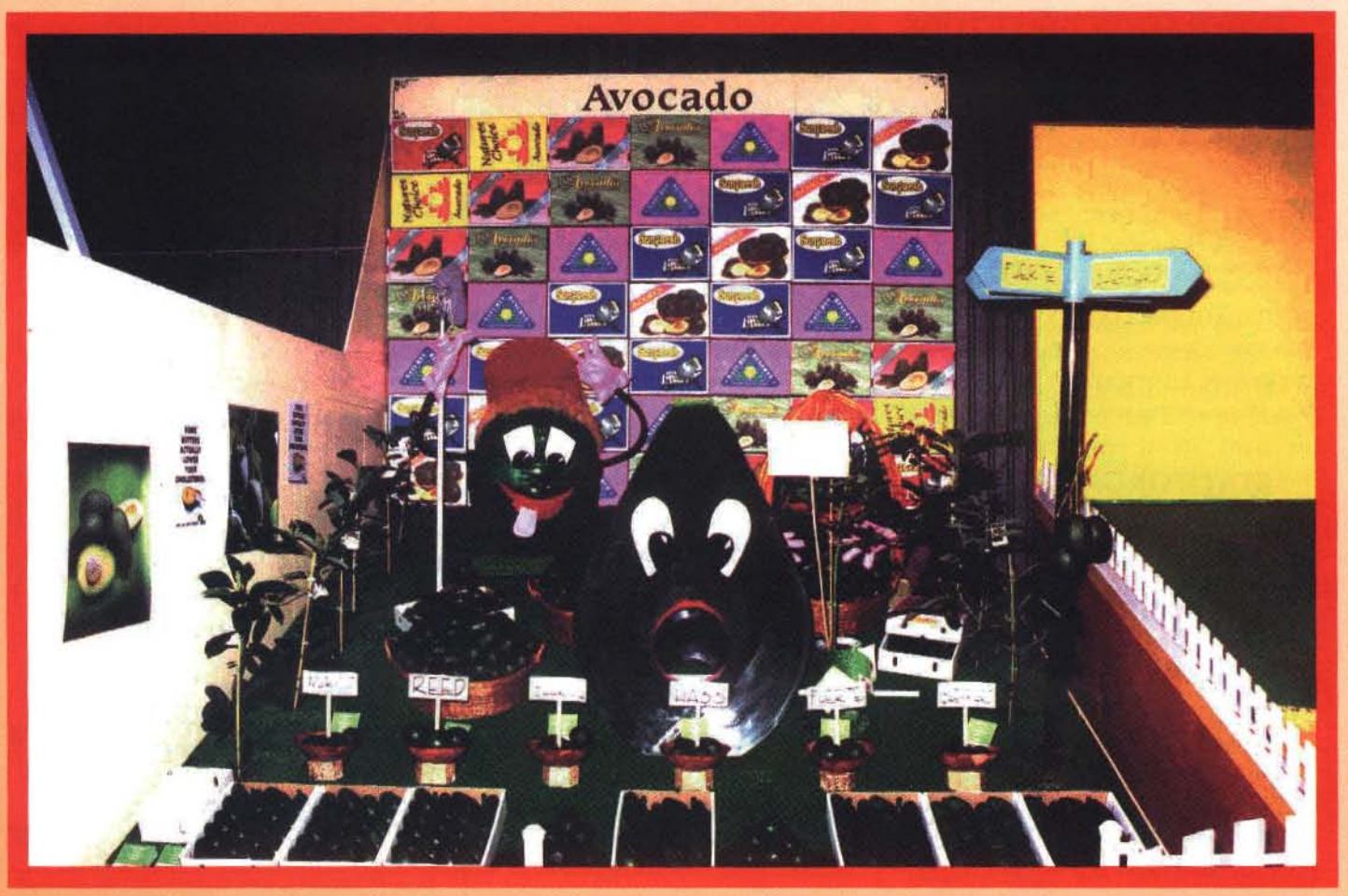

The very popular avocado stand at the Brisbane EKKA

- Protocols for Export
- Technology Exchange
- Results of the AVOMAN Survey
- AustHort R&D program

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AUSTRALIAN AVOCADO GROWERS' FEDERATION

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Calendar of Events

September

20 **Bundaberg & District Orchardists Association** - meeting Fruit & Vegetable Growers' Office, Barolin St., Bundaberg commencing 7.30 p.m.

October

3 **AAGF - Annual Reporting session** - Pioneer Homestead, 128 Long Road, Eagle Heights (Mt Tamborine) commencing 1 p.m.

17 **Avocado Growers' Association of WA** - meeting Conference Room, Market City, commencing 5.30 p.m.

18 **Bundaberg & District Orchardists Association** - meeting Fruit & Vegetable Growers' Office, Barolin St., Bundaberg, commencing 7.30 p.m.

November

15 **Bundaberg & District Orchardists Association** - meeting Fruit & Vegetable Growers' Office, Barolin St., Bundaberg, commencing 7.30 p.m.

December

5 **Avocado Growers' Association of WA** - meeting Conference Room, Market City, commencing 5.30 p.m.

9 **Sunshine Coast Avocado Growers' Association** - Christmas Function at Des and Bev McCulloch's farm, Blackbutt. Transport available. Contact Ursula Starkovsky 07 5493 0605 (evenings).

Front Cover:

The very popular avocado stand at the Brisbane EKKA. (See story page 5)

Back Cover:

Top - *"August is Avocado Month" - the theme of a display at the QDPI office, Mareeba. On display were pests and diseases, publications on all aspects of growing avocados, a spray diary and a chemical record book.*

Bottom - *One of the 65 billboards advertising avocados. This one is in busy Alexander Road, Fitzroy, Melbourne. A close-up of an identical poster was featured on the back cover of the June edition of Talking Avocados.*

Editorial - Orf Bartrop

In this issue, the report on Technology Exchange Within The Avocado Industry is continued. I am sure readers agree that this report is one of the most comprehensive articles that has ever been published in Talking Avocados. The authors are to be congratulated.

AVOMAN was released nearly two years ago and the team from QDPI have conducted a survey to ascertain its acceptance within the industry. To give those growers who do not have AVOMAN the opportunity to see what users have to say, I have reproduced a summary of their findings.

In order to keep growers up-to-date with the big picture, I have also included details of the AusHort R&D Program.

Rod Dalton has dealt with the protocols and procedures for exporting avocados. In the next issue, an article by Henry Kwaczynski (SCAGA) will cover aspects of overseas markets. With growers reporting lower prices for their produce, perhaps now is a good time to get into the export business.

Good News From The Taxman

It is not very often that we hear good news from the taxman but he has smiled on the avocado industry.

The avocado levy paid by growers is not subject to the GST. Therefore, all money collected by the government and forwarded to the AHC and HRDC is still being used as originally intended.

Both the AHC and HRDC pay other organisations to carry out the tasks required by the industry. When those organisations bill the AHC or HRDC they add 10% to cover the GST. However, because the AHC and HRDC are registered for the GST they can claim back that additional 10%. Therefore, the procedure is revenue neutral and same amount of promotion and research can be carried out as occurred prior to the introduction of the GST.

The same applies to the AAGF. As you probably know, the AAGF is partially financed by avocado levies. In normal day-to-day running of the AAGF, expenses occur that are subject to the GST. Like the AHC and HRDC, the AAGF is registered for GST purposes. Therefore, the AAGF can claim back any GST component paid to other organisations. So all told, the GST will have minimal effect on your levies. □

Advertorial

Canopy Management

Over the past 12-18 months, growers have witnessed new hedging techniques in canopy management. Through this method it is possible to sustain crops every year while managing to keep trees down to a maintainable height and a shape which will allow maximum light penetration to achieve higher yields.

From late September, Kerry Smerdon will be offering his contracting services with the use of a new Afron heavy-duty orchard pruner. Kerry has been growing avocados at Glasshouse Mountains in Queensland for eight years. He has an in-depth knowledge of avocados and will be able to customise pruning for any orchard.

If you would like more information you can contact Kerry on 0438 930 268 (b/h) or (07) 5493 0268.

President's Perspective

By Rod Dalton, President AAGF

The AAGF recently advertised for an Industry Manager. This position has been developed to incorporate the Executive Officer function and an Industry Development role.

The AAGF is seeking a full time employee and we have submitted a proposal to HRDC for funding of the Industry Development role. This proposal has been supported in principle and we are awaiting final HRDC Board approval, expected by the end of August. All being well the Industry Manager (IM) will be in place by the end of September.

An important role of the Industry Manager will be the management of the implementation of the industry's strategic plan which is currently being reviewed.

All growers should have received a copy of the discussion paper inviting feedback to the consultants, Macarthur Agribusiness. A series of workshops in the major growing regions has also provided the opportunity for input into the future directions and priorities for the industry.

The AAGF Board will be reviewing the draft plan at its October meeting. The AVOCARE project is identifying a number of issues with respect of fruit handling through the retail sector which the IM will be well placed to progress with the retail sector.

The Horticultural Industry Alliance process to establish a company under Corporations law to replace the existing statutory corporations, the AHC and the HRDC is nearing completion.

The leaders of the horticultural industries met in Canberra on the 14-15 August to review the draft Memorandum of Understanding (MOU) which sets out the key principles and policy considerations underpinning the arrangements and structure of the new company. A number of areas were identified which needed further negotiation with government and the final version of the MOU will be released to industry on 25 August.

Industries need to sign this MOU by 12 September so that the legislation to form the new company and wind up the current corporations can be passed by Parliament in the spring session. The new company will be operating before the end of the year.

This is a good result for industry as we will have a company responsible for providing the marketing, research and development services required by industry, which is owned and controlled by industry. The staff of the existing corporations will be transferred to the new company so the corporate knowledge and understanding of industry issues and programs will not be lost in the change over.

The Annual Reporting session to industry will now be held at "Pioneer Homestead", Mount Tamborine, on **3 October (note date change)** commencing at 1 p.m. All growers are encouraged to attend and hear the reports on the activities of the AAGF, the marketing program and the research and development programs over the past 12 months. Your levies are funding these programs so please come along to be involved. A forum where growers can raise any other issues of concern will be a part of the program.

I hope that by the time you read this, the influx of visitors for the Games will have increased the demand for our product and that returns have increased.

I am well aware that in late August there is a lot of fruit in the markets with most areas harvesting excellent crops. New Zealand has a very big crop this year which they are currently busy sending to USA. Indications are however that they could start sending fruit our way earlier than normal this year due to crop size. □

'Ave an Avo Today'

By Wayne Prowse, AHC

The new advertising campaign that is positioning avocados as a healthy alternative spread to butters and margarine is gaining much recognition.

In June there were 75 outdoor posters through Brisbane, Sydney and Melbourne carrying the avocado advertising message— "Some butters actually lower your cholesterol"—and featured a half avocado and butter knife (see back cover of June 2000 Talking Avocados).

The same posters will be seen through some 15 Adelaide and Perth sites during October to coincide with the start of higher volumes of local productions.

Complementing and extending the outdoor campaign, magazine advertising and in store point of sale extend the visibility of the message. Food magazines including Australian Table, Australian Good Taste and a popular weekly magazine Who Weekly is currently carrying half page avocado adverting encouraging consumers to "spread an avocado instead" whilst selling the health benefit message.

Six new recipes with a "spread" theme or warm serving suggestions are included in the leaflet being distributed through retail outlets and the major shows (Brisbane's EKKA, Adelaide's Royal Show and the Perth Show).

In store posters designed for use in Coles, Woolworths and other fruit shops are also being distributed in cooperation with the retailers. □

Advertorial

Award Winning Avocado Orchard Now For Sale

The prize winning Illowra Orchard (see adjacent page) established 25 years ago is now up for sale.

The avocado orchard is approximately 24 acres and is very well known throughout the Industry. It has won two awards; the Best Avocado Farm in Queensland in a competition promoted by the Queensland Royal National Agricultural Society, and the Royal National Association's prestigious "Producer of the Year" award.

The owners have worked constantly with the Department of Primary Industries (DPI) in researching the growth and diseases of avocados and the property is famous for its rootstock.

The Orchard is diseases free, a remarkable achievement in itself, and shows the commitment to the industry by the owners.

According to Dr Tony Whiley, Principal of Horticulture at the DPI, the owners have had a close association with DPI staff for many years and have allowed their property to be used as an experimental site for most of its commercial life. Thus a substantial record has been built up on the performance of the orchard that shows it to be one of the highest producing avocado farms in the country.

Mature blocks of trees consistently produce in excess of 20 t/ha, which is well above the 7 t/ha Australian average for this crop.

It's Good To Get Recognition

The avocado stand at the Brisbane EKKA was a great hit with visitors. Congratulations must go to Ilia and Ursula Starkovsky of the Sunshine Coast Avocado Growers' Association for formulating the idea of a competition involving avocados and to the members who manned the stall and conducted the promotional activities.

The theme of the stand was to catch the attention of children and educate them to the benefits of avocados. Part of that process was a game involving a giant avocado with avocados as the prize. More details on the stand are given in the Australian Round-up Section, Sunshine Coast, on the next page. There is also a photo of the stand on the front cover.

Two of the people who manned the stand were avocado growers Ken and Muriel Webb of Woombye. They obviously made a great impression on a class from Dutton Park State School. The class has written two letters to the Webbs thanking them for letting them participate in the avocado game.

Because it is nice to see young people who really appreciate something acknowledge that appreciation, a copy of their letters is reproduced here.

Dutton Park State School
112 Annerley Rd.
Dutton Park 4102
14 August 2000

Mrs M. Webb
Hebron Grove, Woombye

Dear Mrs Webb,

On behalf of the year 5/6 students of Dutton Park State School we would like to thank you for your time and patience in letting our class play the game on your EKKA display.

Even though some people didn't manage to win avocados you were very generous in giving them extra turns when they were close to wining. We all enjoyed your display.

Our class thinks you should have the avocado game again next year.

Once again, we would like to say thank you for your time and patience.

Yours sincerely,
Pele, Dana and Shayal
For the students of Yr 5/6

The Chairperson, Avocado Society
C/- Mr and Mrs K Webb
Hebron Grove, Woombye.

We are from Dutton Park State School and on Friday 11 August we went to the Exhibition. One of the highlights of our day was going to the Agricultural Pavilion. We especially enjoyed the avocado display. We thought the game involving the giant avocado and the foam balls was really fun and exciting. Our whole class lined up to play and many of us won avocados.

Our teachers made sure we all took particular notice of your display while we were there and they told us that that was what the EKKA was once all about.

Advertising your products and letting the public have samples to try seems like a good idea to us. We hope you have a similar idea for next year.

Thank you for providing us with not only information but entertainment as well.

Yours sincerely,
Rebecca and Rachel
For the students of Yr 5/6

Australian Round-up

Most growers are picking their Fuerte and are finding out that there isn't a lot of demand for them. There is a heavy crop throughout the region and all markets are having trouble getting a reasonable price and moving volume fruit.

We are looking forward to the Royal Adelaide Show on 1-9 September. The Show Committee has revamped Centennial Hall. The Avocado, Citrus, and Apple and Pear Stands have been made a feature in the Hall.

We are joining the Yellow Brick Road Showbag. This is a showbag that people buy, follow a map to 13 different stands where they are given a free sample of their products. All involved in this have to be in primary production or healthy living, e.g. citrus, honey, dairy, apple, etc.

This is going to be a challenge to us as it is our first year. There are between 17,000 and 20,000 showbags sold each year. This is a lot of fruit to give away. We estimate that 30% of buyers have never eaten an avocado before and we are aiming at getting half of them to become avocados eaters, making this exercise worth while.

A group of ten ladies who do in-store demonstrations of avocado spent a day on Colin Fechner's avocado property to get first hand knowledge on tree size, how they grow, harvesting, handling, and packing. For most of them it was the first time they had seen a mature tree with fruit. They felt it was worthwhile and informative and they are more knowledgeable about what they demonstrate.

Sunshine Coast

EKKA 2000

On Thursday 10 August the EKKA (Royal Queensland Show) opened its doors at the Brisbane Showgrounds for the 125th time and the Sunshine Coast Avocado Growers' Association was there in the Agricultural Pavilion with their new look Avo-Stand (See Front Cover).

After a few hiccups and birthing pains the stand was set up and very favourably accepted by the judges and the public in general.

This year's theme was to attract the attention of the next generation of avocado eaters, the children. They were engaged in a little game, where if they managed to throw 3 out of 5 balls into the mouth of the big Avo they were rewarded with a small net of avocados. The response was overwhelming and some kids came back a few times for a retry. This of course meant that the parents were forced to stay at the stand, where growers were able to engage them in conversations and handout recipe pamphlets.

Bundaberg

The Bundaberg region is expecting to have a good crop this coming season, flowering has started and our little bee friends have begun to do their job. Let's hope that we have now seen the last of the cooler weather and a good fruit set follows.

We have had very little rain in the last few months, 37 mm in May, 35 mm in June, 15 mm in July and 10 mm so far this month, so I suppose you could say it has been dry. Water in the region is still a problem and will continue to be.

It would be nice to see more avocado growers attend the Orchardists monthly meetings, they would be most welcome.

The Strategic Planning Workshops will probably be completed by the time this goes to press. I sincerely hope you attended and had your say!

Greenskins, as in 1999, have proved to be very unprofitable this year. To exacerbate the situation quality was well below normal.

Most growers are now well into their Hass harvest. Some have reportedly finished their harvest as of July. August prices are a little depressed. Hopefully the prices will improve in September and October, as is normally the case. The crop has been affected by the heatwave in January and the prolonged wet of 1999 and 2000 is having an effect on the health of some trees.

Any growers wishing to do a chemical users course take note: the next 2 day course is on Friday 6th and Friday 13th of October at Wollongbar TAFE.

The NSW government as part of its Water Reform Structural Adjustment Program has allocated $25,000,000 to a five year Irrigated Agricultural Water Use Efficiency Incentive Scheme. This scheme will help irrigators to plan, adopt and monitor best irrigation practices and water efficient technologies.

The NSW Government Water Reform Structural Adjustment Program has been established to: assist NSW irrigated agricultural enterprises to adopt best management practices, increase on-farm water use efficiency, encourage better utilisation of the state's water resources, minimise negative impacts from irrigation upon the environment and facilitate a more sustainable and viable irrigated agriculture within NSW. For all enquiries, please call the NSW Rural Assistance Authority toll-free 1800 678 593.

Every year Graeme Thomas is invited across to visit growers and hold field days. This year we decided to get him here earlier than usual so he could get to see a different growth stage. Graeme visited 24 growers in total and held two field days one in Perth and one in the southwest. The field days were well attended; Graeme talked to growers about the effects that rootstocks can have on trees and also showed growers how to take root samples for monitoring phosphonate levels.

The royal show is almost upon us with preparations well underway. The show will be held from 29 September to the 7 October. Later in the year we hope to have Ken Pegg and Sonia Willingham here to talk to growers; we will advise every one of the dates later.

AUSSIE-AVO-NET

Do you want to:

- **Solve your avocado problems?**
- **Learn more about avocado culture and management?**
- **Notify other avocado growers of events in your district?**
- **Find out what is happening in the industry?**

Then join the many growers already using QDPI's AUSSIE-AVO-NET. Log on to the Internet and go to http://lists.dpi.qld.gov.au/AUSSIE-AVO-NET.html (see TA March 2000, page 8 for full details).

TALKING AVOCADOS - HAVE YOUR SAY

Protocols And Procedures For Export

By Rod Dalton, President AAGF

There is increasing interest within our industry in the development of export markets for our increasing production. One of the first steps in establishing an export program is gaining an understanding of the international systems that are in place controlling the movement of products around the globe.

This article has been prepared to provide some details on the current situation with respect to access to various potential markets.

The protocol requirements of overseas markets for the import of fresh avocados from Australia vary considerably and must be handled on a market by market basis.

Some countries such as Hong Kong, Singapore, Malaysia, Nauru and the United Kingdom have approved access for Australian avocados with no restrictions. Fruit is often sourced from the central markets by exporters and is sent to markets such as Hong Kong and Singapore with the growers being unaware that their product is being exported.

Other markets such as New Zealand, Canada, China, Taiwan and Thailand have approved access with restrictions due to concerns associated with risks such as Fruit Fly (Queensland and Mediterranean), mites, Sun Blotch Viroid and chemical residues.

Avocados exported to New Zealand must be sourced from registered trees (sunblotch free), grown in an area that is free of Cercospora (all areas except Atherton Tableland) and be fruit fly free, which currently requires a cold disinfestation treatment.

To export to Indonesia or PNG the fruit must come from a fruit fly free area or be treated with methyl bromide. Avocados from Qld are not allowed access to Fiji or the Solomon Islands, apparently because of Qld fruit fly.

A number of potential markets such as Japan, India, Korea and USA are currently closed to Australian avocados. Gaining access to these markets will involve detailed Pest Risk Analysis reports in most cases and negotiation at Government level. Access to the USA will certainly be complicated by the fruit fly situation in Australia.

The Australian citrus industry has established a very successful export market in the US; however, all fruit must come from normally fruit fly free areas. Qld fruit for example is not allowed into USA.

The AAGF has lodged a submission to the Horticultural Market Access Committee seeking access to the USA for Australian avocados. Fruit fly will also be a challenge if access is sought to the Japanese market. India is a market to which there is currently no access although it may be possible. That market would depend on government to government negotiation where the priority given to products and the relative importance of the industry etc. will all play a part.

The fact that these systems are in place controlling exports can be frustrating; however, the same systems are limiting the access to our domestic market of fruit from other producing countries such as Mexico and USA. □

ANVAS ACCREDITED NURSERIES

ANVAS accredited trees can be purchased from these nurseries:

Rainforest Nursery
Ron and Joan Knowlton
25 Reynolds Street
Mareeba Qld 07 4092 1018

Batson's Nursery
Merv and Pat Batson
Schulz Road
Woombye Qld 07 5442 1657

Anderson's Nursery
Graham and Viviene Anderson
Duranbah Road
Duranbah NSW 02 6677 7229

Birdwood Nursery
Peter and Sandra Young
71-83 Blackall Range Road
Nambour Qld 07 5442 1611

Flemington Market: A Ten Year Review Of Avocado Fruit Receivals And Prices

By John Dirou, NSW Agriculture, Alstonville

What has happened to avocado prices and fruit receivals at the Flemington market, Australia's largest, since 1990?

The table below shows that for the ten year period to July 2000, marketed avocados increased by 80% to 7209 tonnes/year, while the proportion of avocado to total fruit sales in Sydney rose by 0.8% to 2.3%.

Figure 1 shows how the average price for the early variety Fuerte has fallen in most months, particularly in July and August. Many growers now consider this variety to be unsustainable, and for this reason are removing or reworking these trees.

The picture is a little different for Hass (Figure 2) where positive gains of $3 to $4 per tray in the monthly average price has been obtained during the peak harvest period. This augers well for the future of the industry and shows that retailers wish to have Hass fruit on their shelves year round with the exception of the 'Shepard window' in February and March.

We know that the cost of production has increased over the last ten years especially for labour, pesticides and packaging. As an indication the Consumer Price Index has risen in this time by 25.4%, while the Hass price per tray for last season's crop ranged from a 21% increase in August, to 34% in July and September. However, this season's Hass sold in May 2000 had only a 13% price gain, while June fruit sold on an oversupplied market for $1.35/tray less than in 1991. □

Year	Avocado tonnes Received	All fruit Total tonnes	Avocado sales as % of total fruit sales
1990-1991	3998	271080	1.5%

Figure 1. Comparison of Fuerte prices 1990/91 to 1999/2000

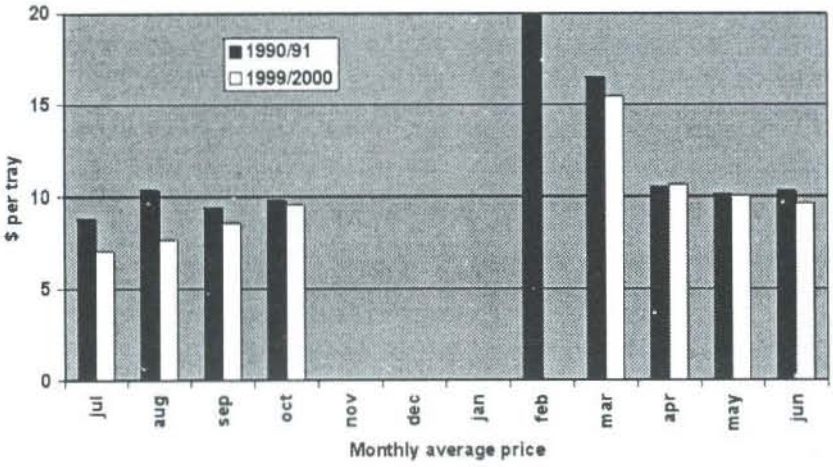
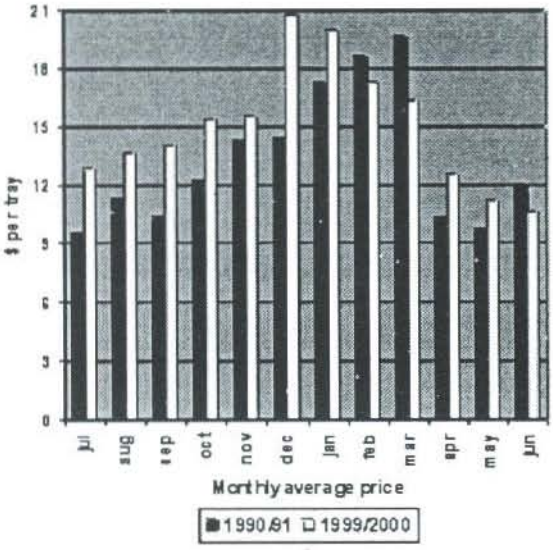


Figure 2. Comparison of Hass prices 1990/91 to 1999/2000



2001 Australian & New Zealand Avocado Conference

For those readers who missed the news, the next Australian/New Zealand Avocado Conference will be held in Bundaberg in June 2001. The details of the Conference are:

DATE **2-7 June, 2001**
LOCATION **Bundaberg, Queensland**

June 2 **Pre-conference tour** leaving from the Sunshine Coast/Brisbane (optional).

June 3 **Pre-conference tour** arrives in Bundaberg.
Registration and **Cocktail Party** to commence at approximately 5.30 p.m.

June 4 **Conference** begins in earnest.
Full day of **technical sessions** at Moncrieff Theatre.
Evening - **Free time**.

June 5 *Morning* - **Technical sessions** at Moncrieff Theatre.
Afternoon - **Visit** to properties in area.
Evening - **Conference Dinner** to be held at the Bundaberg Civic Centre.

June 6 *Morning* - **Technical sessions** at Moncrieff Theatre.
Afternoon - **Visit** to properties in area.
Evening - **BBQ** including a **night session** to be held at a nearby property.
This will be the conference finale.

June 7 **Post-conference Horticultural Tour** - This tour will be a full day's activity and will focus on the many other horticultural industries in the Bundaberg/Childers area.

Technology Exchange Within The Avocado Industry

By Simon Newett and Geoff Waite, QDPI Nambour, Chris Searle, QDPI Bundaberg, and Alan Blight, AAGF R & D Committee, West Australia

The authors of this report attended the World Avocado Congress in Mexico last year. While overseas, they took time out to visit South Africa and the United States of America. Articles on several subjects appeared in the March 2000 editions of this magazine and here are a two more extracts from their visit report.

It should be remembered that the information is presented for your interest, the fact that it is reported here does not necessarily mean it is appropriate or recommended for Australian conditions. By presenting it here the authors hope it will stimulate some thought and discussion on alternative ideas and concepts.

Further articles will appear in the next issue of Talking Avocados.

Pests of Avocados in Other Countries, Especially Mexico and California

Pests and diseases are limiting factors that must be overcome to enable viable cropping in most avocado production areas. For many of the countries in which avocados are produced, information on insect pests that attack the crop is scant or non-existent, particularly for some parts of Africa and Central and South America.

Most of the published information exists for pest complexes in North America and Mexico, Israel, South Africa, New Zealand and Australia. Even so, some of the practical and sometimes important aspects with respect to the propensity for individual pests in all countries to spread from their area of origin to foreign lands is not discussed in the literature.

The opportunity to investigate such aspects of pest ecology, biology and management through in situ investigation and discussion with experts from various countries, is one of the greatest benefits of attending international conferences such as the 4th World Avocado Congress.

During discussions, especially during the congress field trip and on the post-congress tour, there was an opportunity to pursue particular themes in more detail and to observe some of the Mexican pests in local orchards.

Thrips

Since the conference was held in Mexico, there was significant input from Mexican entomologists, and because they contend that thrips are probably their most serious pest, there were a number of papers presented on the subject by entomologists from New Zealand and California as well as Mexico.

The cosmopolitan greenhouse thrips, *Heliothrips haemorrhoidalis*, is a major problem in many avocado production areas especially in California, Mexico, Israel, New Zealand, Chile and South Africa.

Greenhouse thrips infesting avocado fruit in low numbers present no real economic threat. However a population of 6.5 thrips feeding on one 'Hass' fruit in excess of 71.4 days can cause sufficient damage to result in downgrading of that fruit in California. When thrips populations increase unchecked by natural enemies, extensive damage can be caused to the surface of a significant proportion of the fruit in an orchard.

Although the pests may feed on foliage, the main damage is caused to the fruit and is seen as bronzing and cracking of the skin and contamination by faecal deposits. This type of damage on the skin is the type of damage that would normally be expected as a result of thrips feeding.

Surface damage may allow infection by the fungus *Sphaceloma persea* when environmental conditions are favourable. The Mexicans attribute a different sort of damage to thrips as will be seen later in this article and the fixation on this has led to a major secondary pest occurrence.

A complex of several species of thrips damage avocado fruit in the Americas. In addition to *H. haemorrhoidalis* and *S. rubrocinctus*, the thrips species *Liothrips persea*, *Scirtothrips perseae*, *Scirtothrips aceri* and *Frankliniella cephalica* damage the crop in areas from the southern United States through Mexico and Central America to Chile, Brazil and Argentina. All of these species are more important in the tropical and subtropical coastal belts of these countries, while in avocado growing areas at elevations of 1900 m to 2400 m, their impact is reduced.

An important strategy for thrips suppression pursued in these countries is one of orchard management where emphasis is placed on the elimination of weeds and other thrips hosts. Nevertheless, considerable quantities of pesticides are applied to orchards to prevent the perceived cosmetic effect of the induction of bumps and ridges on the fruit (Figure 1).

Although an IPM (Integrated Pest Management) approach was stated to be in place, several applications per season of parathion and malathion were used for thrips control. The effect of these organo-phosphate insecticides on the beneficial fauna manifested as extraordinary outbreaks of brown avocado mite, *Oligonychus punicae*, over the entire avocado crop in the state of Michoacan. In fact, the overwhelming impression of the Mexican avocado industry, at least in Michoacan, is one of brown, not green, orchards as a result of the more than 80% bronzing of foliage caused by the mites (Figure 2). Such infestations must adversely affect photosynthesis.

In Queensland, outbreaks of the related tea red spider mite are common and are often related to over-use of insecticides for leafroller and fruitspotting bug control. If endosulfan is banned in Australia and broad-spectrum chemicals are introduced

The article on this page is sponsored by HRDC and the avocado industry.

for fruitspotting bug control in avocados, then their careful management will be required to prevent a similar mite scenario to that occurring in Mexico.

Research has been carried out in Mexico to find the optimum colour for thrips sticky traps. Yellow, blue, white and red traps were tested and it is no surprise that the yellow traps were the best. Yellow traps are accepted worldwide as being the best for attracting thrips generally!

Other research has looked at the factors that effect thrips populations and resulting damage to the fruit. It was concluded that rainfall at flowering time might suppress thrips populations and reduce damage.

Some thrips have specific climatic and host preferences. For example, *H. haemorroidalis* prefers climatic zones of high humidity and within these preferred areas it is cultivar-selective. The cultivar 'Ardit' is particularly susceptible on the coastal plain of Israel. In California this species prefers the cultivar 'Hass'. Similarly, *Retithrips syriacus*, the black vine thrips, attacks the cultivars 'Horshim' and 'TX-531' in Israel where it is parasitised by the egg parasitoid *Megaphragma priesneri*. It is susceptible to the botanical insecticide sabadilla, which is used to control the thrips in 'organic' orchards. *R. syriacus* has been found in Florida but has not yet been recorded attacking avocado there.

In 1996 a new pest thrips, *Scirtothrips perseae*, was recorded on 'Hass' avocados in California. This is the same thrips species that causes most of the problems in Mexico and is thought to have come from there.

The pest is active throughout the year in California and may be responsible for fruit drop, as well as causing extensive cosmetic damage to those fruit that are retained on the tree. The damage noted is surface scarring, in contrast to the Mexican claims of ridges and bumps! Crop losses of up to 85% have been recorded.

S. perseae threatens the integrity of the IPM system that is used in Californian avocados, since chemical control of the pest with sabadilla, which upsets natural controls, is necessary until specific biological controls can be found and introduced.

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Figure 1. Ridging on Mexican Hass fruit claimed to be caused by thrips

Figure 2. Bronzing of avocado foliage caused by the feeding of heavy populations of avocado brown mite, *Olygonychus punicae*, which are thought to have proliferated due to excessive use of broad-spectrum insecticide.

Figure 3. Damage to Hass fruit in California as a result of *Scirtothrips persea* which arrived from Mexico 2 years earlier. Losses of up to 80% have been estimated from some orchards.

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Experience with new pests in many crops is that in the first few seasons after a new pest incursion, extensive damage is caused until things settle down. This settling down may be due to growers learning how to manage the new pest and local beneficial species catching up with a new host or prey.

In California, while new IPM strategies are being developed for this pest, significant damage is being caused to the skin of the fruit (Figure 3) without any impact on internal fruit quality. This forces Calavo (Californian Avocado Producers) to market the fruit at a lower grading and they are targeting 'foodservice buyers' i.e. processors and product value-adders, in fact they created a new grade they call "salad fruit" to dispose of this fruit.

In Florida, the development of bumps and ridges on the surface of the fruit has been attributed to the feeding activity of flower thrips, *Frankliniella* spp., which are thought to damage ovary cells soon after anthesis.

Perhaps a more thorough investigation by the Mexicans may reveal that one of the other thrips species known to be present there causes similar damage at flowering and may be responsible for the observed ridges on the fruit. If this is the case, it might be expected that one or two sprays at flowering would prevent the problem and limit the development of mite outbreaks. The possible negative aspects of this with respect to the effect on pollinators are discussed later.

Delayed picking of fruit to take advantage of high late-season prices in California, increases the amount of damage caused by *H. haemorrhoidalis* through longer exposure of the fruit to infestation. In contrast, early harvest reduces damage caused in the current season as well as in the following season, through the concomitant removal of actively feeding thrips, with the fruit.

Numerous chemical controls for thrips in avocados are recommended in various countries e.g. mercaptothion, sulphur, maldison, trichlorfon, but the most promising and desirable avenue for control is through biocontrol agents.

In Queensland, greenhouse thrips have occasionally been seen in avocado orchards but they are not a pest here. The Eulophid parasitoid, *Thripobius semiluteus*, apparently keeps it in check on its many alternative hosts, and frequent endosulfan sprays applied for fruitspotting bug control may also suppress thrips populations in many Queensland avocado orchards.

T. semiluteus was purposely introduced into California from Australia in 1986 and Brazil in 1988. It quickly became established and reduced greenhouse thrips populations.

The only other hymenopterous parasitoid recorded in California, *Megaphragma mymaripenne*, which attacks thrips eggs, has little effect on pest numbers. *T. semiluteus* was introduced into Israel in 1991, where it became established and is regarded as an effective natural enemy in that environment. When additional control is required, endosulfan is selectively applied to infested trees only. Two sprays of pyrethrum applied over a period of 21 days provide good control, but the high cost is a deterrent to its use. *T. semiluteus* was apparently accidentally introduced into South Africa where it combines with the pirate bug, *Orius tripoborus*, to play an important role in the control of greenhouse thrips in South Africa.

Pollination

Sprays that might be applied during flowering for thrips control are always a contentious issue because of possible effects on pollinators and fruitset. There were several papers presented at the conference detailing studies on pollination, all carried out in Mexico.

The importance of pollinators in avocados appears to be somewhat uncertain, since in most environments, trees set many more fruit than can be matured and there is rarely a problem with pollination. Nevertheless, the Israelis consider that there is a problem, and have initiated a project to look at pollinators in Mexico.

Various researchers at the conference detailed projects that surveyed the range of insects attending avocado flowers. Through microscopic examination of pollen grains adhering to various parts of the insects' bodies, an assessment was made of the likely importance of each species as avocado pollinators. Honeybees were the most numerous and common visitors and also carried plenty of pollen. A native bee, *Geotrigona acapulconis*, was considered to have greater potential for pollinating avocados because of the amount of pollen adhering to body segments that are likely to come into contact with the avocado stigma. However, numbers of this bee in the orchards were very low and some way would have to be found to culture them and place hives in orchards for it to become the major pollinator The Mexican honey wasp was also considered a useful pollinator.

One study from Chile reported on the importance of management and quality of beehives for optimum avocado pollination.

Plant-sucking bugs: leafhoppers, whiteflies, psyllids, mealybugs and scales

Aethalion quadratum, commonly known as green fly in Mexico and Guatemala, can form dense colonies that may kill new shoots and affect tree vigour, thus reducing yield. The fungus *Glomerella singulata* often infects damaged branches, further significantly reducing yield. Sooty mould is also encouraged by the large amounts of honeydew produced by the insects, which prefer the Mexican-Guatemalan races of avocado such as 'Fuerte'.

Another homopteran, *Metcalfiella monogramma*, the avocado treehopper, sometimes known as the avocado parakeet, is widely distributed on native Mexican avocado cultivars grown mainly in the Altiplano. Their habit of congregating in large numbers on branches on which they feed, can cause these branches to wilt. The decreasing importance of the native cultivars of Mexico in favour of 'Hass' has reduced the status of this pest to one of insignificance in commercial orchards. Control of the hopper on Mexican native trees is obtained with sprays of parathion or malathion.

Whitefly (*Aleyrodidae*) outbreaks, which cause minor leaf distortions on new flush, have occasionally been induced in Queensland crops through the use of synthetic pyrethroids.

A more serious whitefly problem occurs in Israel. In 1978 the Japanese bayberry whitefly, *Parabemesia myricae*, was found to have established there. Native natural enemies did not control it but the aphelinid parasitoid, *Eretmocerus debachi*, introduced from California in 1982, achieved control in two years. Several other parasitoids introduced for the same purpose apparently failed to establish.

Disruption of *E. debachi* by drift from bait spraying for medfly in adjacent fruit orchards in 1992 was only temporary, as the parasitoid subsequently re-established and whitefly populations remain under biological control.

Other whitefly species may affect avocados in Florida, Mexico and the northern part of South America, and to a lesser extent in California, Chile and Argentina. They include *Trialeurodes floridensis*, *Tetraleurodes* sp. and

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Paraleurodes persea. P. persea is the most widely-distributed species in Mexico.

The whiteflies infest the underside of the more mature leaves especially low on the tree. Severe infestations may result in defoliation as well as the growth of sooty mould. The removal of excess undergrowth around the trees and pruning to reduce humidity and shade, have been found to alleviate the problem presented by this pest. In Mexico, chemical controls such as sprays of endosulfan and various organo-phosphates are also applied when necessary.

Six psyllid species of the genus Trioza are known to develop on Persea species in the New World. The most important of these is *Trioza anceps*, the nymphs of which cause the formation of galls as they feed on leaf tissue of avocados (Figure 4). It has been recorded from Mexico and Guatemala almost exclusively on native Mexican cultivars and 'Fuerte'.

In severe infestations, most of the leaves on a tree can be infested with more than one hundred galls per leaf. Such infestations cause significant leaf-fall, which affects production and fruit quality. Natural enemies are unknown and the nymphs inside the galls are safe from contact insecticides, although adults are easily controlled with sprays of parathion or malathion. Minor infestations were observed in commercial orchards inspected, but significant numbers were noted on some cultivars on the CICTAMEX research station at Ixtapan.

The long-tailed mealybug, *Pseudococcus longispinosis*, is a minor production pest of avocados in Chile, but presents some problems in the export market with quarantine considerations. The Australian predatory beetle, *Cryptolaemus montrouzieri*, is an important predator of this pest in Chile. Several scale insects infest the crop in that country, but none are of particular importance.

Caterpillars

Amorbia cuneana may sometimes be a significant problem in California where it is primarily a leaf feeder that may also damage fruit. It is also a pest in Mexico and Central America where *A. emigratella* and *A. essigana* may also be found on avocados, causing minor damage. Often there is no need to control these pests. However in California, the hymenopterous egg parasitoid *Trichogramma platneri*, and in Mexico *T. minutum*, are often mass-released, and these provide good control.

Releases of the parasitoid in California may be made in conjunction with a monitoring system using pheromone traps. Applications of *B.t.* are also sometimes made to control *Amorbia* spp.

Larvae of the seed moth *Stenoma cateniffer*, which ranges from Mexico through Central and South America, bore into avocado fruit of all ages in order to access the seed, which may be completely destroyed by their feeding activity. In doing this, the entire fruit is ruined. Larvae also bore in branches, which affects flowering, often reducing production by up to 90%.

Because the larvae are protected within the fruit or branches, chemical sprays, which in Mexico may include azinphos-methyl, carbaryl and permethrin, are directed at the moths. Alternatively, powdered formulations are applied to the soil to contact moths emerging from fallen fruit. In addition to chemical sprays, good orchard hygiene in the form of pruning and collection of fallen fruit and its disposal, form a major part of control tactics for the pest.

The larvae of the papilionid butterflies, *Papilio garamas garamas* and *P. victorinus morelius*, and those of the moths *Eacles imperialis* and *Copaxa multifenestrata* (Figure 5) occasionally defoliate trees in Mexico and Central America, but they are of minor importance. These are large magnificently coloured caterpillars that lend some beauty to orchard landscape. Because they are of minor concern they are generally allowed to develop unharmed.

Similarly, the lepidopterous leaf-miners *Marmara salictella* in California, and *Gracillaria persea* in Michoacan, Mexico, cause relatively minor damage. The latter species is more important at the cooler, higher altitudes of 1900 m to 2400 m and in late summer and autumn may infest 80% to 90% of the leaves.

Boring beetles

In Central America and Mexico, avocado fruit are attacked by the larvae of two species of weevil, *Conotrachelus persea Barber*, the small seed weevil (Figures 6 and 7)

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Figure 4. Galls on the foliage of avocados in Mexico caused by the psyllid *Trioza anceps*.

Figure 5. Larva of the moth *Copaxa multifenestrata*, a minor leaf feeder on Mexican avocados.

Figure 6. Larvae of the small seed weevil, *Conotrachelus perseae*. Strict quarantine measures are imposed to prevent its spread from Mexico to the USA.

Figure 7. Larva of the small seed weevil *Conotrachelus perseae* and damage to the flesh of the fruit.

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and *Heilipus lauri Boheman*, the large seed weevil. These weevils tunnel through the flesh of the fruit to the seed and in so doing may result in the loss of up to 80% of the crop. Because the weevils have limited flight capability, their movement from orchard to orchard is generally dependent on the transport of infested fruit. This has quarantine implications with respect to potential exports (see later).

Chemical treatment through frequent sprays of methyl parathion or azinphos-methyl applied when adults are active, or malathion dust applied to the soil to contact emerging adults, is used in combination with sanitation through the destruction of infested fruit and quarantine procedures, to restrict the pests' movement. Several species of the weevil genus Heilipus, including *H. lauri* occur throughout the southern USA, Mexico, Central America and South America. *H. apiatus* occasionally kills avocado trees in Florida by girdling them at the base.

The avocado branch weevil, *Copturus aguacatae*, causes severe damage by boring in the branches and trunks of avocado trees. This reduces yield through the effects of defoliation and consequent poor health of trees, leading to flower and fruit abortion. In extreme cases, trees may be killed. Poor orchard management contributes to the severity of the problem and the viability of avocado production in the Atlixco region of Mexico is threatened. As with the seed weevils, cultural controls such as pruning and burning affected branches and quarantine of infested orchards, are necessary to reduce the pest's spread and impact.

Other related species of minor importance throughout Central and South America are *C. perseae* in Colombia, *C. constrictus* and *C. lunatus* in Brazil, and *Copturomimus perseae* and *Copturomimus hustachei* in Costa Rica.

Research in Mexico examined the population fluctuation of the seed weevils and the potential of the entomophagous fungi *Metarrhizium anisopliae* and *Beauvaria bassiana* in comparison with methyl parathion and Stickem®. The latter two treatments provided acceptable control.

In North America the fruit flies *Anastrepha ludens*, *A. serpentina* and *A. striata* are classified as quarantine risks for 'Hass' avocados entering the USA from Mexico. These fruit flies have been recorded attacking 'wild' avocados in Mexico but not 'Hass' and there was no sign of them either in avocado orchards that were visited or in the many loquat and guava fruit that were examined along the way. It seems that the elevation and consequent relatively low prevailing temperatures on the Altiplano are sufficiently cool to prevent fruit fly problems.

Nevertheless, to prevent incursion by these pests as well as the seed weevils into US avocado-growing areas, guidelines for the export of 'Hass' avocados to the USA have been developed. These include transport of fruit in clean, closed, refrigerated vehicles and provision of phytosanitary certificates specifying freedom from fruit fly and stem and seed weevils.

In 1998, Mexico succeeded in gaining access to the USA. Now that the US market has opened, Calavo, the growers organisation in California, has opened a packhouse in Uruapan so that rather than fight the imports they have an interest in them and a further profit motive. Protocols have been put in place with respect to detection and culling of fruit infested with seed weevils and a technology that involves differential air pressure within and outside the packhouse to blow potential pests such as fruit flies, away.

Mites

Several spider mite species *(Tetranychidae)* infest avocados, in particular those belonging to the genus Oligonychus. This group of mites normally infests the upper surface of mature avocado leaves although colonies may spill over to the underside when populations become exceptionally high. They may then also infest new leaf flushes. When populations reach such levels, extensive bronzing of the foliage occurs and damage is most likely to the leaves, resulting in a concomitant reduction in photosynthetic activity.

Oligonychus punicae, the avocado brown mite, infests avocado trees in California, Florida, Mexico, Central America, Brazil, Argentina, Colombia, and Ecuador. Phytoseiid mites such as *Euseius hibisci*, a native of Mexico and Central America, although they feed on *O. punicae*, are unable to prevent outbreaks of this species in California even though few insecticide sprays are applied to the crop.

Despite the introduction into California of six exotic species of predatory mites from Central America, none of these has become established, and biocontrol of the spider mite continues to rely on the coccinellid beetle, *Stethorus picipes Casey*. *O. yothersi*, the avocado red mite, has a similar distribution to *O. punicae* but is only an occasional pest.

In addition to *S. picipes*, other natural enemies that have been noted in association with these mites are *Oligota oviformis*, *Chrysopa* spp., *Scolothrips sexmaculatus* and several *Typhlodromus* spp. As mentioned in the section on thrips above, Michoacan avocado orchards were universally brown due to the feeding damage caused by *O. punicae* that was stimulated by the disruptive effects on the natural enemies of pesticides, mainly parathion and malathion, applied for thrips control. It would be interesting to investigate the deleterious effect of the mites in relation to the perceived status of the thrips!

A new mite pest in California, *Oligonychus perseae*, causes necrotic lesions on leaves (Figure 8) and severe defoliation in some orchards, mainly 'Hass'

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Figure 8. Leaf damage and nests of the persea mite, *Oligonychus perseae*, in Mexico.

and to a lesser extent 'Gwen' and 'Reed'. *O. perseae* was originally incorrectly identified as *O. peruvianus*. It was noted as a pest of avocados in Costa Rica in 1978 and in Mexico in 1983.

The mites occupy the underside of leaves and produce a protective cover of webbing that form 'nests' in which about ten eggs are laid. The young then proceed to develop in this protected environment and their concentrated feeding causes necrotic lesions to develop along the midribs and main veins of the leaves. Individuals of the normal complex of predatory mites that inhabit avocado trees in California find it difficult to penetrate this webbing although *Galendromus (Typhlodromus) annectens* has demonstrated its ability to do so and feed on the mites.

The feeding by colonies of mites in their discrete 'nests' and the resulting circular chlorotic spots are evident on the upper leaf surface and in severe infestations, leaf-fall exposes fruit to sunburn.

Because of the protected habitat of the mites, chemical control has been difficult to achieve and a search has been initiated for an effective predatory mite. This is centred on Mexican and Central American production areas where the mite is thought to have originated, but where it apparently is not of economic significance.

A difference in the susceptibility of different avocado cultivars to this mite has been noted. 'Hass' and 'Gwen' are susceptible; 'Fuerte', 'Lamb Hass' and 'Reed' are resistant while 'Esther' and 'Pinkerton' are intermediate. It is suggested that seasonal changes in the nutritional quality of leaves may be the major factor determining susceptibility of avocado cultivars to *O. perseae*.

In California the six-spotted mite, *Eotetranychus sexmaculatus*, inhabits the under-surface of leaves and can cause defoliation at relatively low population levels. Such severe damage is rare since the phytoseiid mites, *E. hibisci* and *Amblyseius limonicus* apparently keep it in check. However, in groves adjacent to citrus that have been heavily treated with insecticides, high populations of six-spotted mite often develop. This mite is also a likely migrant from avocado areas in Mexico and Central America.

Chile has a rapidly expanding avocado industry that has relatively few major pests. *Oligonychus yothersi*, which causes damage to the leaves similar to *O. punicae* in Mexico and California, is generally not important and is controlled by the predatory beetles *Stethorus histrio* and *Oligota pigmaea*.

Summary and implications for Australian avocados

The most important pests of the major avocado producing countries of the world

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Report Becomes a Best Seller

The article "Technology Exchange Within the Avocado Industry" is part of a report called: Technology Exchange at 4th International Avocado Congress in Mexico during October 1999, including information from a visit to South Africa and California.

This report has become a best seller with readers purchasing more than 80 copies. The authors are to be congratulated on their thoroughness and dedication in compiling this report.

The report can be purchased from the HRDC for AUD$20 or US$30 for orders from outside Australia. Credit card facilities are only available for orders placed through the HRDC/AHC website http://www.horticulture.com.au

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are thrips and mites. This contrasts with the situation in Australia where fruitspotting bugs and leafrollers are the most important. In addition, Mexico and other Central American producers have to contend with several species of fruit borers—the moth seed borer and the seed weevils. These may cause considerable damage in their own right, but they are also important with respect to international trade. Other countries don't want these pests and that includes Australia. The entry of Mexican avocados into the USA will provide impetus for attempts to export to Australia. The import of avocados from Mexico and other Central American countries should be resisted as far as is possible in order to limit the possibility of these pests gaining entry to Australia.

With respect to our own pests, we are doing all that is consistent with respect to the development of IPM strategies and given the particular problem of fruitspotting bugs in Queensland, our industry is faring reasonably well. The information gained from this conference concerning potential pests from other countries will be invaluable in making risk assessments and dealing with exotic pest incursions.

New insect pests in California

Several insect and a mite pest have recently arrived in California. The most serious is the thrips, *Scirtothrips perseae*, which arrived from Mexico only 2 years ago and is causing severe cosmetic damage to fruit, so much so that a new grade standard has had to be developed, which is referred to as "Salad" grade (Figure 3). Affected fruit is sold to the restaurant and hotel trade. The perseae mite, *Oligonychus perseae*, has defoliated trees in some areas, but infestations appear to have settled.

Olive fruit fly from the Middle East has recently arrived in the San Joachin Valley. The Mexican fruit fly was discovered during October within a few kilometres of an avocado packshed, which was subsequently quarantined.

Diseases

As Mexico is one of the three main centres of origin of avocado, a large number of diseases that have co-evolved with the plant can be found in Mexican orchards. Many of the diseases described below are not found in Australia, or cause only minor damage under commercial conditions. Some of these diseases may pose a considerable quarantine risk to Australian production if fruit from Central America or South America is ever allowed onto our domestic market

Phytophthora

Phytophthora citricola

In most of the orchards we visited we were shown examples of trees with trunk cankers that were attributed to *P. citricola*. In some orchards up to 50% of the trees were reportedly infected with the disease. *P. citricola* cankers resulted in loss of bark, conducting tissue and supporting wood, though this wood decay may be aided by secondary fungi. The overall result is a slow decline in tree health and vigour and eventually death. Infected limbs were also prone to breaking off under high wind conditions.

The Mexicans indicated that they had tried a number of control measures, none of which were particularly effective. The recommended control was to paint the canker and surrounding area with a copper solution. Phosphorous acid used to control *P. cinnamomi* in Australia was reported to be ineffective.

In private discussions with Professor John Menge, University of California, Riverside, he indicated that up to 30% of the cankers attributed to *P. citricola* in California were probably due to Dothiorella infection and had in the past been misdiagnosed. Dr Menge is currently re-examining a large number of these cankers in order to clarify the situation.

If other organisms are involved, the development of new control strategies may be required. If fruit from California or the Americas is allowed into Australia then this may pose the risk of introducing a potentially more virulent strain of Dothiorella. This may also have implications for other industries such as mango, which is also attacked by Dothiorella.

Phytophthora heveae

We were shown cankers attributed to *P. heveae* at two sites. These cankers were generally smaller than those attributed to *P. citricola*. It was difficult to get an estimate of the amount of trunk canker the Mexicans were attributing to *P. heveae*, though they did seem to indicate that possibly 5-10% of all trunk cankers were caused by *P. heveae*. These cankers were generally found higher up on the tree limbs compared with *P. citricola* cankers, which were usually close to the ground on the trunk. We were however, shown a reportedly *P. heveae* canker at ground level. The symptoms include a canker with large areas of discoloured wood. These cankers can reportedly move rapidly and may kill the tree in less than a year.

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Again, in private discussions with Dr Menge he doubted that the cankers were caused by *P. heveae*, as in his opinion it had been recorded only rarely on avocado. Dr Menge was going to follow this up and do some work separately to confirm the Mexican diagnosis.

Phytophthora boehmeriae

P. boehmeriae is also apparently a problem in some orchards where it causes a black rot of young fruit soon after fruit set. It can be found high up on the tree on the fruit and the trunk. Infected fruit has a characteristic blackening.

Phytophthora cinnamomi

While Phytophthora cinnamomi did not co-evolve with avocado in Mexico, it was widespread throughout orchards where it appeared to be responsible for a reasonable level of yield loss. The damage was not as severe as would be expected under Australian conditions. While there was concern among the Mexicans about *P. cinnamomi* and the level of damage, there appeared to be a considerable amount of misdiagnosis. For example, at one orchard the Department of Agriculture staff showing us around indicated that *P. cinnamomi* was not present in the orchard, yet there were visible symptoms on most trees at a level that would have been rated as moderate in Australia. Damage at this level was almost certainly impacting on production.

P. cinnamomi has only relatively recently, in the last 20 years, become a major problem in Mexican orchards. The widespread nature of the disease is attributable to the lack of nursery hygiene and orchard quarantine practised by avocado producers in Mexico. Nursery trees are grown on the ground using non-sterilised soil; thus ensuring trees are infected from an early stage.

The Mexicans have tried phosphorous acid injection, the control method used to control *P. cinnamomi* in Australia, and reportedly have had little success. This may be partly attributable to the injection method, which uses a hole bored into the tree into which a phosphorous acid solution is dripped from a used intravenous injection bag. The strength and purity of the solution also appears to be highly variable. Because of the apparent 'misdiagnosis' of phytophthora in Mexico, the reported lack of success with phosphonates may be due to a pathogen other than *P. cinnamomi* being treated.

The main method of control advocated in Mexico is similar to that which was used in Australia prior to the advent of phosphorous acid. The first stage involves cutting the tree back to a stump 'staghorning' and then adding 100-150 kg of fresh cow or chicken manure. The ground may also be sterilised by solarising the soil by covering the ground with plastic sheeting for several weeks. Trichoderma may also be added to the soil and it was claimed that Trichoderma could be isolated from the soil after two years. The tree then recovers and returns to cropping after three years. Applications of 80-100 kg of manure are then made annually and 100-200 kg of composted pine bark may also be added around the tree. Mulching, using a variety of animal manures and plant residues, is a major component of the integrated management practices put forward by the extension service and appears to have been widely adopted by the growers.

Control of phytophthora is achieved as the 'staghorning' and ammonium toxicity from the manure results in major root death removing the fungal food supply. In addition, the nitrite in the manure is probably directly phytotoxic to the fungi, further reducing inoculum levels.

As the level of the fungus in the soil declines, the tree roots recover and the tree returns to a reasonable level of health. However, after several years the amount of root in the soil increases, increasing the fungal food supply and the fungus again starts to have a detrimental effect on tree health. This control strategy is enhanced by the climatic and soil conditions that result in the tree experiencing only moderate levels of stress.

Professor John Menge is trying a somewhat similar approach of using mulches and calcium supplements. In this method the trees are left unpruned, but large amounts of composted organic matter and calcium (gypsum) are added around the tree. This results in the tree roots moving up into the mulch, which is a less stressful environment for growth.

Dr Menge was using a range of mulches, from barks to composted municipal waste. Interesting to note that he found **fresh sorghum mulches could result in phytotoxicity of avocado roots** as breakdown products from the sorghum were released. Any grower who regularly uses fresh sorghum mulch, cut and immediately applied under trees, should closely monitor their orchard for damage.

Professor Menge also stated that in California, the addition of potential antagonists, such as Trichoderma, *Bacillus subtillus* and Pseudomonads had been unsuccessful due to poor survival and colonisation. However, field trials in California have begun using field fermenters to produce *B. subtillus* that can then constantly be injected into the irrigation system. The work is still in its infancy and no results are available. It should be noted that South African research by Dr Riaan Duvenhage indicated that some biocontrols, *Aspergillus candidus* and *Trichoderma hamatum*, could be established in the field where they improve disease suppression.

Another strategy being investigated in California is the use of surfactants through fertigation. Surfactants cause the motile spores of *Phytophthora cinnamomi* to burst. In South Africa they are experimenting with trunk applied sprays of phosphorous acid on mature trees.

Another disease in Mexico, Ganoderma, produces symptoms similar to *P. cinnamomi*, but in this case it is the structural roots that are attacked rather than the feeder roots. When the bark is peeled back it has a characteristic smell and in humid conditions, mushroom-like fruiting bodies are produced near the trunk.

Roseelinia necatrix

Roseelinia necatrix has not been recorded on avocados in Australia. It is another soil born fungus that has been found at several sites in Mexico. Its presence is causing some concern at the CICTAMEX germplasm repository La Cruz, where several trees have been lost to the disease.

The disease reduces tree health and usually results in death. Its occurrence is sporadic and it kills small areas within the orchard. On one of the field trips, Dr Pliego-Alfaro stated that in Spain *R. necatrix* is more destructive than *P. cinnamomi*, and was one of the major impediments to the further expansion of the Spanish industry. The disease can be isolated only from roots greater than 2-3 cm in diameter or by removing the bark. The only successful method of control is solarisation of the soil prior to orchard establishment. It is apparently not controlled by phosphorous acid. There are also a large number of alternative hosts such as apples, grapes and olives.

Sphaceloma persea - "Scab" or "Roña"

Sphaceloma persea is apparently the causative organism of a disease called Roña (pronounced Ron –ya) or scab, by the Mexicans. However, they have not been

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Figure 9. "Scab" known as "Roña" in Mexico.

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able to experimentally infect fruit with *S. persea* to see if it causes the symptoms of the disease, despite 10 years of trying.

The disease is characterised by rough corky or scabby brown patches on the exterior of the fruit (Figure 9), but does not appear to cause any internal damage and there appeared to be no post harvest breakdown problems. In Australia, damage of this nature is usually attributed to wind rub.

The problem is reportedly quite severe in some orchards with up to 20% of fruit affected—fruit which cannot be exported to the United States. The Mexicans have associated high incidences of Roña in orchards with high thrips infestations at flowering and early fruit set. Thrips control therefore has apparently taken on an additional dimension, not only to control the skin marking directly attributed to thrips feeding, but also to control the incidence of Roña. The heavy and possibly inappropriate chemical use to control thrips and Roña has resulted in problems with severe brown mite, *Oligonychus punicae*, outbreaks in most orchards (Figure 2).

Anthracnose

The Mexicans have the both perfect form, *Glomerela cingulata*, and the imperfect form, *Colletotricum gleosporoides*, of anthracnose on the fruit. The lesions caused by the perfect form of anthracnose are quite different from those caused by *C. gleosporoides* in Australia.

In Mexico, the perfect form of the disease causes raised warty protrusions 2-5 mm high and 2-5 mm across, similar to miniature volcanoes, on the outside of the fruit. These warty protrusions give rise to the local common name for the disease of "Viruella" (chicken pox) and "clavo". The disease causes post-harvest breakdown of the fruit and no fruit showing symptoms of the disease can be exported to the USA. The disease also reportedly causes reddening on the peduncle of fruitlets and a darkening of the shoots from the external surfaces into the cambium and symptoms similar to "dieback'.

Control is achieved with copper fungicides, usually Bordeaux mixture, applied at a high rate by workers with hand lances, on a monthly basis during the fruiting season. In contrast in Australia, trees under similar rainfall pressure would need to be sprayed on a two to three week schedule to ensure adequate control.

The Mexicans have also trialed the new fungicide Azoxystrobin (one of the strobilurin group) against anthracnose and Roña. In trial work, applications commenced at early fruit growth and continued every 14 days for eight applications. The azoxystrobin was compared against copper oxychloride (2 kg/ha) and Benomyl (500 g/ha). The highest rate of azoxystrobin (250 g/ha) gave the best control of anthracnose, nearly three times better than the copper treatment, though even the lowest rate of 50 g a.i. /ha was more effective than copper. None of the treatments had any effect on Roña. This would tend to confirm our feelings that Roña is a physical defect, not a pathological one. There have also been reports of resistance to azoxystrobin by various fungi in Mexico

Trunk cankers – general

Trunk cankers caused by a range of organisms are a major problem in Mexico. They are generally worse in the warmer, more humid lower growing regions, and are more prevalent in the wet season. Water from sprinklers may exacerbate the problem, particularly if it wets the trunk of the tree.

Another organism that reportedly causes a basal trunk canker is *Fusarium oxysporum*. These cankers often occur where the irrigation sprinkler wets the trunk, and in favourable disease conditions it can kill a tree within a year. Initial symptoms are a discoloured dark area on the trunk followed by cracking of the bark, then the appearance of a white crystalline powder (avocado sugar) around the wound.

Control measures include lowering the relative humidity around the trunk by skirting, and keeping the area weed-free. Copper sulphate is also applied to the trunk at the start of the wet season and if the disease occurs, surgery is used to remove the affected area. The wound is then treated with Bordeaux mixture or a commercial sealant containing fungicide, or the area may be cauterised by fire.

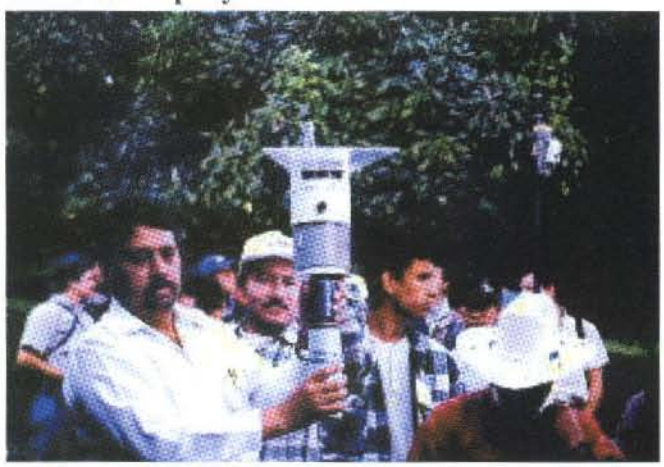
Other organisms implicated in causing trunk cankers are *Fusarium solanii* and *Nectria galligena*.

Verticillium albo-atrum is also a problem as it is in Australia, where it causes verticillium die back. It is known as "violent death" in Mexico. Typically one branch

The article on this page is sponsored by HRDC and the avocado industry.

Figure 10. Fruit affected by sunblotch viroid was seen in Mexico and California.

Figure 11. Luciano Moralez Garcia with the device he has developed in Mexico for monitoring disease spore levels in the orchard to assist with spray decisions.



dies causing leaves to dry out but do not fall. The presence of the disease can usually be confirmed by stripping away the bark and looking for a darkening of conducting tissue.

Minor diseases

The Mexicans attributed a superficial darkening of outer twigs and branches seen on many avocado trees to the fungus Stigminia.

However, in private discussions with Professor John Menge, he indicated that in Chile the same disease or a disease very similar in type was penetrating the bark and causing shoot dieback. On his return to UCLA he was going to investigate this further. Contact will be maintained with Professor Menge concerning the Chilean organism. Since returning to Australia, this disease has been discussed with Mr K Pegg, Senior Principal Plant Pathologist, Indooroopilly, who is in the process of reclassifying this group of fungi. Mr Pegg believes that the disease has been misidentified and the Mexican organism is possibly a *Stomiopeltis* spp.

Armillaria mellea is a disease that affects the root system. Roots have dark bands on their surface and fruiting bodies appear above the ground during the rainy season.

Another disease described by the Mexicans is referred to as "measles". It penetrates the pulp to the seed, attacks flowers and leaves as well and is most prevalent during the rainy season.

Viruses

Sunblotch viroid is apparently widespread in most orchards in Mexico. One orchard visited had infected fruit. The disease is characterised by discoloured sunken depressions in the fruit (Figure 10).

Unknown viral particles

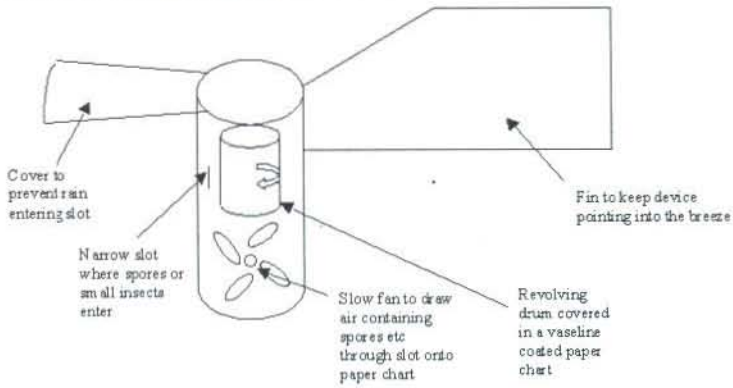
In a discussion with Dr Menge he indicated that Professor Alan Dodds of UCLA, Riverside, had very recently isolated viral particles from avocado that were not sunblotch viroid. At this stage the organism has not been identified.

Mr Klaus Bederski, a large nursery producer from Peru, also indicated that the International Centre for Potato Research (CIP) in Peru had isolated potato spindle virus from a number of avocado trees in his country.

Australia currently has a large virus-indexing program for sunblotch viroid in avocado. It would appear that potato tuber spindle virus and this potentially new virus may have to be added to the list of diseases that comprise the screen program.

. Vigilance will be needed on the part of DPI and the AAGF to ensure that developments in the identification and virulence status of these two new potential viruses is maintained, so as to avert any potential risk to the Australian avocado industry.

Figure 12. Device used to monitor spore counts and small insect levels in Mexico.



Disease monitoring in Mexico

Luciano Moralez Garcia in Mexico has developed a device for monitoring disease spore levels and small arthropods such as mites and thrips (Figure 11 and 12). Its use has resulted in a reduction in the number of fungicide sprays per year from about 12 down to four or five. In order that it might be widely used, it is constructed out of cheap and easy to obtain materials. The slow fan is powered by a solar panel and the revolving chart driven by the clockwork drum from a thermohygrograph turns one revolution per week.

Phytophthora root rot control in South Africa

In some respects, the SAAGA injection recommendations differ from those of Australia.

The similarities are:

- A spring injection is recommended after the spring flush has fully expanded (about Oct-Nov).
- A summer injection is recommended after the summer flush has fully expanded (about Feb-Mar).

The differences are:

- A 10% solution is used, not buffered.
- A dose of 20 mL (rather than 15 mL) per metre of canopy diameter is used.
- For severely affected trees a mid-winter (after harvest) injection is used.
- The 10% solution does not appear to cause leaf burn.

In practice it appears that many orchards are using the mid-winter injection even on trees not severely affected. The logic is that it is a long time between summer and spring injections (7-9 months) so a winter injection is used to maintain phosphonate levels in the roots even though uptake at this time will be inefficient. Syringes are used. Labour costs are much cheaper in South Africa than Australia.

Uptake of chemical from injection equipment is slower in winter and distribution of phosphonate is less efficient, but growers see flowering and fruit set as being a critical time when an effort should be made to provide maximum protection.

Current research in Australia, aimed at developing a system for monitoring phosphonate levels in the roots, will allow growers to make a more informed decision on fungicide application requirements whether it be by injection or spray. Like Australia, South Africa has also had above average rainfall this year.

Fruit disease control in South Africa

Interestingly, anthracnose does not appear to be a major problem in South Africa, probably because of the drier environment where most of the crop is grown (the industry in the Northern Province is situated several hundred kilometres from the coast and at some elevation). However Cercospora spot, caused by *Pseudocercospora purpurea*, is a serious problem, but just a few copper sprays control it. Hass is generally sprayed only once per season with copper oxychloride at 3 g/L in about January (copper hydroxide is regarded as too expensive in South Africa) and Fuerte (still an important variety) is sprayed three times (November, January and March). Sprays are applied by hand using hand-held jets and with very high volumes (up to 20 L on a large tree).

Minor Diseases in California

- *Phytophthora citricola* – trunk canker.
- *Xanthomonas campestris* – bacterial canker.
- Sunblotch virus. □

The article on this page is sponsored by HRDC and the avocado industry.

E-grocery Shopping To Dominate?

by Fiona Douglas, Marketplace News

With the turn of the century comes the inevitable crystal ball gazing regarding where we will be in years to come.

In terms of grocery retailing, it seems a fairly safe forecast that Internet grocery trading will grow, if not come to dominate how society buys its food.

Within 10 years or so, consumers might well be passing up the weekly 'battle of the trolleys' in favour of a peaceful shop-from-home. And it is a further safe prediction that the major chains will eventually encourage this form of trading and the fruit and vegetable industry will need to adapt to this new way of moving produce to the consumer.

The state of play

Of the three major chains, only Coles is offering Internet grocery sales and delivery to customers in Sydney and Melbourne and this is on a limited basis—41 suburbs in Sydney and 91 suburbs in Melbourne (see box).

Safeway and Franklins have no Internet sales and, according to a spokespeople from each organisation, neither company has plans to do so in the foreseeable future.

A few independent grocers under the IGA banner are offering Internet sales, according to a David's spokesperson, but this is in an ad hoc manner (there is no formal plan for Internet sales for IGA as a group).

Some specialist companies are emerging, such as Shopfast.com. This company is a distribution service, sourcing dry groceries through David's Campbells Cash and Carry outlets and greengrocers and then home delivering to customers.

Why it will work: banks forge the way

If the imminent rise of e-grocery shopping forecast here seems a little hard to envisage, consider the transformation of another customer-service type industry that has taken place in recent years; namely, banking.

From 'a branch in every suburb' and virtually 100% face-to-face transactions just 10 years ago, banks have used computer technology to effect a paradigm shift in the way people go about their banking business. And now that the dust is settling, many consumers would probably agree that electronic and telephone banking are far superior to wasting time standing in a bank queue.

This is only of significance to supermarkets because the banks have effectively primed the marketplace for electronic business. Banks dragged customers kicking and screaming into e-commerce, but now that they are there many are finding the scenery is not so bad. Society is becoming electronically sophisticated and supermarket Internet sales can ride on the crest of this wave.

Reduced costs

E-grocery shopping offers considerable efficiencies that will make it attractive to retailers. These would include:

- rental savings with no need to occupy large buildings in prime commercial positions;
- no food wastage due to exposure to customers;
- reduced insurance costs regarding public liability etc;
- no retail premises maintenance and cleaning;
- no car parks;
- no infrastructure costs, such as display cabinets, checkouts, freezer chests, trolleys;
- reduced staff numbers;
- no shelf stacking or end of gondola display work;
- no shop lifting; and
- reduced distribution costs (customer pays for delivery under e-grocery trade—perhaps a franchised delivery network?).

Time saving

A major draw card for consumers will be the time saving nature of e-grocery shopping. For more than a decade now we have heard how society is becoming increasingly time-poor. Indeed the grocery industry has evolved to cater to this change, with 24 hour shopping being a good example, along with value added products that offer meal solutions to busy families.

It is these same shoppers who will find value in the time-savings e-grocery shopping brings. And the size of the time saving is no small offering, when you consider the typical shopping trip. It involves getting the car out, driving anywhere from five minutes to 35 minutes away.

A car park then must be found and a trolley located. Many people do not carry a shopping list, so this may well mean a systematic cruise of the aisles in hope to prompt the memory.

The food must then be paid for after standing in a queue and then be loaded into the car. If you consider yourself a good citizen you will likely return the trolley to its parking bay which is located somewhere in the car park (usually nowhere near where you parked your car). Then you have to unload the car when you get home which can involve three or four round visits between house and garage.

This whole process can take anywhere from 1.5 hours to 3 hours.

Reduced stress

For a significant segment of the population the traditional grocery shop is considered a chore, and a tedious one at that.

Coles E-grocery Shopping

Coles Online started operation in June last year and extended to Sydney in December. It is currently limited to residents in 91 south-eastern suburbs of Melbourne and 41 north-west suburbs of Sydney.

Some 40,000 items are on offer, these include dry grocery lines as well as dairy and fresh and frozen foods. Some 300 fruit and vegetable lines are available. Customers can also select from a range of beer, wine and spirits.

Dry goods will be delivered to customers in recycled cardboard boxes supplied by Visy Board and delivered by Australia Post in customised refrigerated vehicles.

The service cost is $12.50 which includes personal shopping, packing and delivery for any order, with the minimum order value being $60.

Payment can be by credit card or C.O.D by EFTPOS when the load arrives. Alternatively there is an account service that customers can apply for.

The Sydney launch some five months ago followed on the success of the Melbourne venture. Coles Myer expects to expand its Coles Online services in the months ahead.

Trolleys not working, baby crying, children tantrum-throwing, older children nagging, fighting for a car park, EFTPOS card not working, forgetting what items you went out for, unable to find the item you want, unable to find a staff member for assistance, picking the 'wrong' checkout queue, a 'price check' that takes forever, trying to sneak 10 items in the 'eight items or less lane' and getting caught (or waiting in fear of getting caught—just as bad), safety fears at night, running late to collect the children from school, meat going off and ice-cream melting as you get stuck in traffic going home...

E-grocery shopping puts paid to these stresses.

Money savings

If the round trip is 20 km to the nearest major supermarket, then car costs (based at 50c/km) come to $10 for one expedition. Other savings from e-grocery shopping will include reduced prices that will undoubtedly flow as e-grocery trading becomes mainstream (as listed above).

Those already using e-grocery shopping services have reported other forms of savings, such as no impulse buying. It seems likely that time will change this as marketing strategies develop for the Internet grocery sites (cyber loss-leaders?).

Finally, if you attach a monetary value to your leisure time of (say) $20 per hour, then e-grocery shopping could represent a further value of $30 to $60 per trip. This brings the monetary savings (excluding the possibility of cheaper goods) to $40 upwards.

When will the majors move?

Coles is already testing the water with its limited Internet service. The question arises as to what the other major chains will do as this new industry of e-grocery shopping unfolds. Could it be, for instance, that Safeway and Franklins are strategically waiting, letting the new specialist companies and Coles grow the market. Safeway and Franklins could then make their entrance and would have little trouble competing on price with specialist firms that are purchasing through wholesalers such as David's.

Of course the risk for Safeway and Franklins is that they will leave their run too late and market share will be firmly held among those early entrants.

Future - return of the corner store?

Crystal ball gazing now some 20 years ahead, perhaps we will see the supermarket retail outlet reduced to corner store dimensions.

This outlet will become the premium priced form of grocery buying compared with its Internet alternative—a convenience store—with high margins to reflect the low volume, labour intensive and infrastructure-costly nature of the business. □

Web To Change Global Retailing

From Marketplace News, May, 2000

Three major forces—the World Wide Web, health issues and globalisation—will have a major impact on the future of the retail industry, according to Ron Floto, chief executive of Dairy Farm Holdings.

Mr Floto was speaking at FHA2000 Retail Conference, which was held at the same time as the Asiafruit Congress in Singapore.

In a presentation that focused on the first of the three forces, Mr Floto said that in the immediate future the Web would dramatically change the way retail business was done.

Dairy Farm has made a significant investment in three e-commerce grocery businesses, which were being integrated into the core operations of the group's retail business. Business-to-business applications provide greater opportunities than business-to-consumer. Retailers and suppliers would welcome the new technology because of its potential to reduce administrative costs, improve administrative accuracy shorten lead times and reduce demands on working capital.

He cautioned against the pre-occupation of the Web's role in retailing to consumers. In his opinion, many of the current Internet grocery start-ups would fail and the survivors would be mostly niche players in a sector dominated by a small number of major retailers.

Dairy Farm operations include Wellcome, Hero and Cold Storage in Asia, Woolworths New Zealand and Franklins in Australia. □

Natural Food Supermarkets And Convenience Stores Planned For London

From Nam News

In the midst of an on-going battle among supermarkets in the UK that are competing for space and consumer spending, Greenways Natural Food Stores announced that it will spend at least £2 million (US$3.16 million) to develop "a three-tier retailing strategy" that includes organic convenience stores, local market stores and natural food supermarkets of 10,000 square-feet.

The first natural foods convenience store was scheduled to open in the West One Centre on Oxford Street in May. Greenways plans to open ten more such stores in London by 2002.

"The natural and organic food marketplace has grown enormously but we think there's an opportunity to take it even further—right into the hands of the average shopper," said Greenways' chief executive Michael Pettett.

The organic convenience store will sell ready-to-eat and HMR foods, plus fresh fruit, vegetables and bread. It also will have a juice bar and a small drugstore selling natural remedies and beauty products.

Many of the products will be made exclusively for Greenways. Greenways also plan to open a larger natural foods market store this year. It will offer a much wider range than the convenience store, with a hot food counter, salad bar, in-store bakery and a full pharmacy. Four natural food supermarkets are planned for London in the next five years. □

What features do you find frustrating or lacking?

We have attempted to answer responses where possible (in italics), some of the issues will be addressed in future updates:

- would like yield records in trays as well as tonnes = *in next update;*
- we need the endosulfan report set up in the program = *in next update;*
- separate sub-program for newly planted orchards = *plan to write a new section in the Help files to cover this;*
- reject bin analyses needs hail included = *suggest you use "Other" and write comment in Notes box;*
- nutrition recommendations leave no freedom for anything different = *AVOMAN provides proven recommendations which you have the option of following or not following, it also allows you to set your own N, K and B rates ("Your Rates" feature). In addition you can record any nutrition application you like (whether it is an AVOMAN recommendation or not) and if the fertiliser you use isn't amongst those already described in the Products table it is easy to add it yourself;*
- drag enviroscan data into the tensiometer section = *enviroscan has its own software but there's nothing to stop you entering, for example, the mm of available water in the soil profile from enviroscan data into the tensiometer section. Providing an automatic download feature is considered too much work for the resources we have available and the anticipated number of people who would use such a feature;*
- having to enter blocks when recording watering time = *AVOMAN records are block based, the Multiple Blocks feature allows you to record uniform jobs across several blocks in one entry;*
- weather records only allow one wind direction (per day);
- updating types of fertilisers;
- the ease with which existing information can be overwritten when not clicking "+";
- prices module – want to enter net figure with place to record deductions, also size 15 and 16 and 28/30 often have different tray price;
- prices module - should be a space for gross amounts and levies to be taken out;
- printed reports are hard to follow;
- graphical display of soil moisture (mm) on weather graph;
- in spray diary records, chemical mixtures are tedious = *the operations report offers a simpler spray diary;*
- have to delete spray mixture ingredients separately;
- dealing with sections of orchard affected by phytophthora = *best to establish a separate block in AVOMAN for these trees.*

Are you using AVOMAN to help you make decisions on your orchard?

Yes	40	(82%)
No	9	(18%)

How often do you use AVOMAN?

Several times per week	12	(18%)
About weekly	19	(28%)
About monthly	22	(33%)
Occasionally	14	(21%)

If you don't currently find the yield and prices modules useful, what changes/enhancements would you suggest to make them more useable?

- Make it easier to enter details.
- Useful to have the same format as Natures Fruit Co.
- Meld the two modules into one and double entry of tray numbers is a nuisance = *The next update will allow copying tray counts from the yield to the prices page, it will also provide a consignment note.*
- Analysis of packout.
- Extend it to a trace back system as well.
- Prices module entry should be gross $/tray then a space to add in deductions = *not every agent/merchant uses the same method of feedback, some provide a net figure with the deductions already subtracted, others provide gross amount and deductions listed separately.*

Impact On Your Enterprise

In which areas has AVOMAN assisted you in your enterprise? (Respondents could tick one or more of 9 options.)

Overall understanding and knowledge of crop.	49
Tree health.	39
Day to day planning and management.	38
Quality assurance requirements.	32
Fruit quality.	29
Yield.	25
Fruit size.	21
Reduced fertiliser and/or chemical expenditure.	20
Other:	3

"allowed me to become a more professional manager, chemical diary, recording and reporting device."

Estimate of both the direct and indirect financial impact that the AVOMAN project has had on your enterprise. (Respondents could tick one of 5 options.)

Over $50 000 per year	3	(6%)
$10 000 - $50 000 per year	0	
$1 000 - $10 000 per year	24	(46%)
$250 - $1 000 per year	17	(33%)
Less than $250 per year	8	(15%)

Based on this information it is estimated that the financial impact of the AVOMAN project to growers is around $0.5 to $1.0m per year (between $3000 and $6000 per grower per year).

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Future of AVOMAN

Rate the importance of keeping AVOMAN up-to-date with new recommendations.

High priority	56	(82%)
Medium priority	12	(18%)
Low priority	0	

Rate the importance of keeping the Help files up-to-date.

High priority	38	(54%)
Medium priority	27	(39%)
Low priority	5	(7%)

Rate the importance of including significantly more pictures such as pests/disease symptoms and nutrient deficiencies.

High priority	40	(59%)
Medium priority	21	(31%)
Low priority	7	(10%)

Rate the importance of improving and including new reports.

High priority	29	(43%)
Medium priority	27	(40%)
Low priority	11	(17%)

What new reports or changes/enhancements to existing reports would you like to see?

- Fit spray diary on 1 page, comply with NRA requirements for endosulfan use. *= a facility to record the new endosulfan spray details will be included in the next update, however this will make it virtually impossible to fit everything on one page – an alterative is to use the Operations report as a spray diary (just select the relevant categories to appear such as insecticides and fungicides).*
- Convert litres per tree to millimetres in water management report.
- More reports (e.g. irrigation and fertiliser reports) need to cover (in summarised form) more than one block on the same report (as well as the option of being able to report on a single block).
- I'd love to use the spray reports but don't find it easy.
- Change format so that more records would print on 1 page.
- Simplify yields/prices by combining = *option to copy tray counts from yield module to prices module page will be in the next update.*
- Able to download (AVOMAN) updates from the web.
- Benchmarking capacity.
- Reports waste paper in headings.
- Ability to list all sales with a total for the year.
- World markets.
- Comparison between countries with similar climates.

Are there any other areas you'd like to see covered by AVOMAN in the future?

- Accounting package for multi-crop management.
- Canopy management recommendations.
- The agro-economical part of it.
- Keep it updated with NRA.
- Endosulfan application details recording = *template will be provided in next update.*
- Weed and grass control.
- Info relating to organic growing.
- Update AVOINFO with recent papers = *yes, we intend to.*
- Conditions that lead to anthracnose/stem end rot and connect AVOMAN to weather stations so can be used for disease protection.
- More user friendly.
- Space to record other company's information.
- An agricultural and horticultural suppliers list, could be funded by suppliers advertising their goods.
- Crop forecasting for the current year.
- GST friendly.

AVOMAN Support

What importance do you place on having technical support available from the AVOMAN team?

Essential	22	(33%)
Important	38	(57%)
Don't need it	7	(10%)

Would you like more software training?

Yes	24	(39%)
No	38	(61%)

If "yes" would you be willing to pay for it?

Yes	18	(64%)
No	10	(36%)

How would you rate the importance of continuing the newsletter?

Essential	16	(24%)
Important	49	(73%)
Don't need it	2	(3%)

Do you have access to the Internet?

Yes	62	(86%)
Will have in 3 months	2	(3%)
No	8	(11%)

Note: As a matter of interest at least 108 (57%) of the 189 commercial operators with AVOMAN now have e-mail addresses.

Have you accessed the AVOMAN website? (www.dpi.qld.gov.au/avoman was established in Sep 1999.)

Yes	23	(32%)
No	48	(68%)

Do you check the AVOMAN web site's "Noticeboard" from time to time?

Yes	17	(27%)
No	46	(73%)

Summary

- 208 copies of AVOMAN have been distributed in Australia to date, 189 of these are held by commercial operators.

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AVOMAN SURVEY

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Yes	23	(32%)
No	48	(68%)

Do you check the AVOMAN web site's "Noticeboard" from time to time?

Yes	17	(27%)
No	46	(73%)

Summary

- 208 copies of AVOMAN have been distributed in Australia to date, 189 of these are held by commercial operators.
- Approximately 91% of those growers who bought AVOMAN are using it or

AusHort R&D Program 1999/2000 and 2000/01

Moving into its third year, the AusHort R&D program is really building up momentum. In early March 2000 the AusHort R&D Committee met to finalise the 1999/2000 program and develop the 2000/01 program. Following is a summary of the continuing and new programs.

Advancing horticulture's coordinated response to the Existing Chemical Review Program

This is a key project in the AusHort R&D program The project employs a consultant to provide a coordinated response from horticulture to the National Registration Authority (NRA) Existing Chemical Review Program (ECRP).

This project is initially addressing endosulfan and methyl parathion. Below is a snapshot of some of the achievements to date:

- Use patterns in horticultural crops have been confirmed.
- Residue data requirements have been agreed with the NRA.
- Proposals for specific industry data requirements have been developed and forwarded to relevant peak industry bodies.
- Negotiations with chemical companies for coordinated involvement in data generation.
- Ongoing liaison and negotiation regarding the Occupational Health and Safety requirements.
- Ongoing liaison with chemical companies with respect to potential alternative pest management solutions.

A large part of the project supports communication with industry associations and Industry Development Officers, which in turn is disseminated out to growers via association newsletters and industry media.

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Understanding the implications of Codex issues to horticulture

At the September 1999 AusHort R&D Committee meeting an overview of Codex issues was provided. It was suggested that horticulture should consider investing resources into this area, as among other things, the Codex organisation has worldwide responsibility for setting MRLs for food products.

The AusHort R&D Committee has since decided to conduct a needs analysis to provide background information on the Codex organisation and determine what, if any, investment in Codex issues is required for horticulture, the most appropriate funding source(s) and suggested mechanisms by which these needs can be met.

Improved labelling of pesticides to encourage optimum use in horticultural crops

The aim of this project is to identify the various issues regarding labels on pesticides. These could range from anomalies (such as recommendations varying between States), to missing information (such as recommendations for different sprayer types), lack of clarity (such as size of print or volume of information), or any other issue.

Based on this information the research team will develop an action plan to enable the horticultural industries, with National Registration Authority and AVOCARE (the chemical companies association) to address these issues.

Addressing quality management and food safety issues in horticulture

This project seeks to tackle an area sometimes considered a movable feast in horticulture, quality and food safety. A reference group has been formed with the aim of highlighting and addressing industry concerns in this area. An example is the need for multiple audits, which concerns many growers as an unacceptable cost to business.

The reference group aims to involve supermarkets and accreditation organisations and also link with federal government initiatives to reduce the burden of food safety requirements on the horticultural industries.

This is a clear example of an area of concern to growers across horticulture that is best tackled by the industries working together to provide strength in numbers and enough funding to make things happen.

1999 World Trade Organisation research program for the Australian horticultural industries

The AusHort R&D Committee initiated this project to ensure the preparation of information on the Australian horticultural industries for the 1999 round of World Trade Organisation (WTO) talks in Seattle. The main aim was to ensure the availability of quality data for the Australian trade negotiators to assist in gaining further market access and trade reform in the international marketplace.

Aspects covered in the working paper included:

- Production, export trends, competition and Australian support programs.
- Horticulture and multilateral trade negotiations
- Trade policy analysis and case studies on the European Union, USA, Japan, South Korea, Indonesia, China and Chinese Taipei.
- Profiles on the many Australian horticultural industries including avocados.

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Summary - November 1999 round of World Trade Organisation negotiations

The Australian World Trade Organisation (WTO) negotiation team set out to support the Cairns Group in their agricultural challenge to the dominant European and USA trading blocs during the lead up to the WTO multi-lateral trade talks. Australia's reform agenda at Seattle in November 1999 included reductions in tariffs and quotas, domestic support arrangements and export subsidies.

While outcomes negotiated during the Uruguay round in 1995 resulted in the reduction in tariffs and the establishment of tariff rate quotas, the next WTO round still provides a very good opportunity to seek further reductions in support and protection. Issues relating to high tariff and quota volume restrictions, stringent sanitary and phytosanitary regulations and trade-distorting domestic support arrangements in target markets and competitor countries will be addressed. Other issues during the round could include matters of state trading enterprises, trade in genetically modified organisms, food safety and labelling, intellectual property rights and country equivalence.

Horticultural audit of production and sustainability

This project is another one of the first investments by the AusHort R&D Committee that is being conducted in conjunction with the National Land and Water Audit. It involves documenting the use of natural resources by Australian horticulture, understanding the extent of current impacts of those resources, both positive and negative, and assessing the industries level of adoption of good management practices, and the need to move to a more sustainable basis.

The data and information collected will assist in:

- Industry planning and policy development.
- Identifying critical R&D gaps in the area of environmental management.
- Identifying where R&D investment in environmental issues is likely to result in the highest returns for industry.

The development of a coordinated R&D program for fruit fly baits

Fruit fly control is a major issue across many of the horticultural industries. In September 1999 the AusHort R&D Committee decided to support a workshop involving relevant horticultural representatives to address field control of fruit fly to determine how best to improve the current bait formulations through an R&D program.

In line with the recommendations from this workshop, a proposal has been supported by the AusHort R&D Committee to conduct trials in the Riverina, Queensland and Western Australia, involving staff from the agricultural departments in each state.

The planned outcome is the registration of two new competing baits as well as continued work on dyes and on techniques to improve the performance of the existing baits.

GMOs in Horticulture - consultation forum

In October 1999, horticultural representatives met to discuss genetically modified organism (GMO) related issues of major importance to horticulture.

The forum had two purposes:

1. To bring the leaders of Australian horticultural grower peak industry bodies up to date on the wider issues related to biotechnology and GMOs including how consumers view GMOs, how the food industry views GMOs, the relevant health and environmental aspects and other associated issues.
2. To provide an opportunity to join in discussions with AFFA on the horticultural aspects of important issues related to GMOs that need to be considered by the government in developing its Agri-food biotechnology strategy.

Major areas discussed were:

- Trade in genetically modified commodities, processed food and fibres.
- Changes in agri-food production and processing systems.
- Research, development and intellectual property management.

The major issues of concern for horticulture arising from this forum were the low level of understanding of the technology by industry and consumers, compliance costs associated with labelling and certification of origin, consumer requirements for product labelling and transparent information, government regulation and statutory requirements, access to enabling technologies (particularly for smaller industries), and intellectual property management of GMOs and associated technologies.

Fresh Care - Approved Supplier Program

Quality and food safety systems are now being demanded by customers in order to gain access to markets. The development of the Fresh Care - Approved Supplier Program was initiated in response to a need to assist growers meet market requirements for minimum food safety standards. The final stage in implementing a national quality/food safety program based on the Approved Supplier Guidelines is to have an auditing component for growers to show their customers that they are meeting the program.

A project was supported by the AusHort R&D Committee in 1999 to progress the development of a business plan for Fresh Care, to examine the establishment of a legal entity and to investigate options for seed funding to establish the program.

As part of this project it was recommended that the best mechanism for an industry owned and managed approved supplier program is a company limited by guarantee. The company will work to meet industry objectives and therefore will be non-profit. Membership will be offered to industry organisations and be managed by an industry Board.

Actions to date include:

- The development of the business plan.
- The appointment of legal advisers who are progressing the development of the constitution.
- Liaison with industry organisations regarding membership is underway.
- The draft code of practice and accreditation requirements is being circulated with industry for comment.

Horticulture Emergency Plan

The Horticulture Emergency Plan (HEP) is the national emergency management plan for the combined horticulture industries in Australia.

HEP is a template that has been developed to ensure that industries are equipped to prepare for emergencies that may affect multiple horticulture industries, or overwhelm a single industry. Each industry or sector can use this template to develop their own emergency management plan for emergencies impacting on it. Practically speaking, this means that industries are well prepared with a plan of actions that can quickly be turned on when a potential emergency becomes a reality. Some examples of industry emergencies may include papaya fruit fly and fire blight.

The long-term success of Australia's horticultural industries in securing prosperous local and international markets relies on the industries' commitment to product integrity and quality management. This commitment will be reflected in the industries' skill in rapidly identifying and responding to potential or actual problems that may result in emergency situations. An effective response will ensure that each industry maintains its sound reputation as a producer, supplier, processor or retailer of quality products. □

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An avocado display at the QDPI Office in Mareeba

One of 65 billboards advertising avocados, this one is in Melbourne