

Talking Avocados

Avocado Promotions

World Avocado Conference Report

Analysis of Canopy Management Options

Autumn 2004

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

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Chairman's Perspective

Welcome to the first edition of Talking Avocados where the editorial management has become the responsibility of the Avocados Australia office. By producing the magazine "in house" we aim to maximise the opportunities to communicate within the various sectors that comprise our industry and ensure that information is relevant, appropriate, interesting and made available to industry in a timely manner.

I would like to thank Col Scotney on behalf of the Board and the Industry for his excellent work as editor of Talking Avocados over the last 3 years. We wish him every success for the future.

Fruit Quality

In the last edition of Talking Avocados I discussed the challenges associated with providing the avocado consumer with a reliable product. The potential problems "associated with immature fruit being rushed onto the market to 'cash in' on the high returns available" were highlighted. In mid February there were significant levels of fruit breakdown observed at both retail and wholesale level in Eastern Australia. The problems were not limited to one or two growers but were predominantly associated with early Northern Queensland Shepard.

In hindsight the problems were the result of a number of contributing factors including: (a) fruit being of "marginal" maturity (as opposed to optimal maturity), (b) significant rainfall events prior to and during harvest, (c) limited use of the best available disease control technology and (d) poor cool chain management.

I would like to touch on a few of these issues.

Fruit Maturity

As there is now no legislative requirement for minimum maturity levels or percentage dry matter (%DM), with the exception of Western Australia, commercial pressures are encouraging growers to harvest fruit well before "optimum maturity". Examples of concern:

1. Grower A is ready to harvest and assures his packer the fruit is mature. A dry matter test is conducted and the average is 17%DM. Thankfully that fruit was not harvested at that time.
2. Grower B harvests, packs and markets his fruit and expects to receive the results of his DM test 2 days after the fruit has been sold. What remedial action would have been taken if the fruit was found to be immature?

Disease control

The industry has invested significant dollars from your levies over a number of years seeking better disease management systems. The registration of Amistar provided growers with significant new technology to aid disease control. Initial indications are that utilization of this technology has been limited. While I appreciate that the cost is high I encourage you to review the information previously published in Talking Avocados and consider the benefits of being able to incorporate a curative treatment in your disease management programme, particularly in those areas which have enjoyed a more

normal wet season.

Action.

At the recent AAL Board meeting a working party was established to consider the options available to industry for improved management of quality issues such as immaturity, over maturity, frost damaged fruit, poor ripening practices and poor cool chain management. Government expects industry to self manage these types of issues. If the industry is not proactive on these issues we face the financial penalty of having the consumers' avocado eating experience spoiled by the actions of a few operating outside what we regard as industry "best practice".

United States-Free Trade Agreement (US-FTA)

There has been considerable interest in the fact that avocados have been included in the US-FTA. While the quota allocation is a good outcome for our industry it is only part of the story. Until we have satisfied all the phytosanitary requirements to be granted access to the USA the quota cannot be utilized. The industry has been working for 3 years towards gaining access and we look forward to that process, which tends to be rather slow, being fast-tracked or at least sped up now that we have an opportunity to supply the quota free of tariffs.

AAL Membership.

Membership numbers are steadily growing and I remind all who have not yet "got around to it" that if you want to have a say in how your industry is managed, your first opportunity will be through the election of the AAL Board by June 30. Only financial AAL members will be able to nominate and/or vote.

Rod Dalton

Rod Dalton

Chairman Avocados Australia

**Talking
Avocados**



Growing the Future

Welcome to the first ever “in-house” edited Talking Avocados. I am pleased to announce that the Avocados Australia Board decided that the industry journal should be managed more directly within our national office. The team that will oversee the production of the journal will be our newly appointed editorial committee made up of Chris Nelson, Wayne Franceschi, Annette Williamson and myself. We all look forward to the ongoing evolution and improvement of the journal and look forward to receiving your input and feedback.

United States-Free Trade Agreement (US-FTA)

The US-FTA has over the last two months been a topic causing continuous discussion and questions, particularly in horticulture. A full description of the avocado quotas can be found in this issue. The opportunity here for avocados is the potential tariff-free trade into the US market, but this can only occur once we have market access (quarantine) protocols in place. As an industry, we began this process over 3 years ago and we are now in the hands of the US Department of Agriculture. We will continue to push where we can, however, we are talking years not months.

South African Research Symposium

For the second time, two Australian industry representatives attended the South African Avocado Growers Association’s Annual Research Symposium in Tzaneen, South Africa. Alan Blight of the AAL R&D Committee and I attended the Symposium. Due to the similarities between our growing environments both countries benefit considerably from the exchange of R&D and Marketing experience. Our Australia-New Zealand 2005 Conference in New Zealand will allow the continued building of linkages with the South African industry. We hope to see many South African growers there.

AAL Board Meeting

In mid March the Board of AAL met in Brisbane. This meeting each year sets the program for R&D and Marketing for the coming financial year. The Marketing schedule can be seen in this issue along with an overview of the program from our Horticulture Australia Marketing Manager, Trudy Gosney. The R&D overview will be included in the next issue of Talking Avocados.

The Board considered a number of important issues, two of which are outlined below.

1. Fruit quality was discussed and debated at length. The management of this issue is becoming more difficult as governments step away from direct control to industry self management. There is no regulation of fruit maturity anywhere in Australia, except in WA. The Board is very concerned with the issue of fruit quality. It has commissioned a working group that looks to include wholesalers and retailers to investigate this issue as a way of us working together to come up with a positive outcome.
2. The Board has established an Export Development Committee. The

By Antony Allen

Antony is CEO and IDM of Avocados Australia

Committee is made up of a number of interested parties that have worked with AAL over the last 18 months in the area of export. It will meet in Brisbane on 26 May to consider how most effectively to allocate the \$20,000 for export development.

The Committee members are:

Henry Kwaczynski (Chair)
Lachlan Donovan
Jim Kochi
Ron Simpson
Bryan Raphael
Brian Prosser
Antony Allen (AAL CEO)
Wayne Prowse (HAL Export Manager)

If you would like to suggest/propose an effective export development project please forward your formal outline in writing to export@avocado.org.au or fax to 07 3213 2480.

AAL Board Elections

The first full AAL Board elections are just weeks away. If you are a member already you will receive notification of the election process in the last week of April. If you are yet to join Avocados Australia it is only \$110 for 12 months and gives you the opportunity to fully participate in the election process. BE A MEMBER, HAVE YOUR SAY!!

In the Future for Talking Avocados

We would like to develop a number of new areas for Talking Avocados over the next few issues. Classified ads for service providers and growers, publication and website reviews of benefit to avocado growers, letters to the editor, relevant international articles and a “what’s on” section. Look out for these new additions over the next few issues. We would be pleased to receive your thoughts and ideas on additional material you would like to see.

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Australian Roundup

New South Wales

By Chris Nelson

To start with the bad news: Most growers have a lighter crop for harvest this season and to make matters worse, most have experienced significant losses from sunburn in February.

And the good news: Up and down the NSW coast the rainfall has been good since Christmas.

NSW Avocado Growers Association now formally exists under the umbrella of the NSW Farmers Association. To join NSWAGA, growers simply need to join NSW Farmers Association: phone 1300 794 000. The immediate benefit of this arrangement is that with only one membership fee, you not only have access to the most powerful agripolitical lobby group in Australia, along with all its membership benefits, but also growers have an opportunity to share with their peers those avocado specific issues that remain uppermost in their minds.

On the topic of important issues, I must send an urgent reminder to growers that since September 2003, there has been a statutory requirement to satisfy the NSW government regulations on Occupational Health & Safety. Regardless of whether you are a sole operator or employ a team, you must be able to prove you have taken all reasonable practical measures to ensure the health, safety and welfare of employees, contractors, and visitors at your workplace. A failure to comply leaves your business at the mercy of both the government auditors, and of course the judiciary.

Implementing an OH&S Plan on your farm can be viewed similarly to implementing a Quality Assurance scheme. If a sensible approach is taken, the outcome you achieve will always enhance your ability to manage your business. There are many places to look for assistance, but one of the most comprehensive tools I have seen is the "Farm Safety Guide" produced by NSW Farmers Association.

North Queensland

By Col Cummings

In my last report I indicated that the "short supply" of fruit in New Zealand and Western Australia would allow Shepard a bigger window for this year. With the Far North Queensland Shepard season starting earlier than usual some growers elected to pick for "market price" rather than "fruit quality". We are all now paying the price for that short sighted view of a small number of growers. Outturn reports on early fruit were appalling with the fruit rot percentage being very high and hurting the good reputation we have been steadily building over the years. What does it take for growers to realise that this is just another issue that will close the Shepard window even further? Supplying the type of fruit that was on the market in mid January and early February will certainly come back to haunt us next year.

The Roadshow and R&D work over the last little while gave us tools to use to assist us in getting good quality fruit onto the market, but by and large this has been ignored. Do we need more communication on ways to keep our product in good shape? The AAL web site is now another tool to assist growers to do that, but at the end of the day, commonsense must apply and I'm afraid that did not occur in this instance.

We had a chance to "show" our product to the public at the "Atherton Race Day" held on the 28th February and the "Food Expo" at the Malanda Festival on the 20th/21st March. My thanks to the growers who provided their produce for these days, and to the Land and Lavers families for their assistance in running the stand in Malanda.

As reported elsewhere in the publication, the election of Directors is imminent and with this in mind you should have joined AAL for your right to vote for the Director of your choice to represent you in steering our Industry into the future.

Tri State

By Colin Fechner

The AGM of the South Australian Avocado Growers Association Inc. will be held on May 6th at the Waikerie Hotel beginning at 9am.

The guest speaker for the day will be Marie Piccone. Marie has just finished a study on canopy management options in avocados involving growers in all avocado growing regions. We will keep the AGM business short to allow Marie plenty of time for her presentation and to field questions. After lunch, we will visit 2 properties using different types of canopy management. The day will end with a BBQ and refreshments.

A reminder that subs are due at the meeting.

The crops in the area are looking reasonable. An extremely light crop has just finished and the up coming crop is about 75% of the 2002/03 yield.

The weather has been changing monthly. November was hot, December average, while January recorded the coolest temperatures ever. February was our hottest month on record, and so far in March the weather has been beautiful autumn weather (24-30C days and 8-12C overnight).

Sunshine Coast

By Henry Kwaczynski

The season began in earnest with predictable problems with anthracnose in Fuerte and sunburn in all varieties, due to harsh climatic conditions early in the year. This may lead to opportunities for the provision of fruit for processing. The long awaited oil processing plant planned for Cleveland seems to be still a while away. However I am led to believe that other operations in Australia are now up and running and on the lookout for fruit supplies.

We had an interesting presentation at one of our SCAGA quarterly meetings from an accountant who spoke about tax implications with the disposal of assets (farms). As we live in an area where there is heavy demand for land for 'tile farming', this was a very hot topic and generated a lot of interest and food for thought.

Our December meeting included a presentation from the Senior Rural Advisor from Workplace Health and Safety (Queensland Government). This was most informative, but somewhat daunting in terms of the scope of the implications of WH&S. From information available, it appears that some auditors are using a 'jack boot brigade' approach. If you are facing an audit, I suggest that you are fully conversant with current WH&S regulations and aware of the scoping requirements of

Australian Roundup continued

the audit.

Western Australia

By Wayne Franceschi

WA has had a good season and some high prices were reported. The coming season is looking pretty good so far, Perth should be up on last year and the South West is much the same. Some very hot days in November and then again in February caused bad sunburn and some heavy fruit losses.

Our AGM was held in March with Alan Blight the returning chair. Alec McCarthy from AG WA presented a report on his trip to the V World Avocado Congress in Spain.

It was good to hear from growers saying the Roadshow was a great success and everybody found it very informative. Thank you to everyone who helped on the day.

South Queensland

By Rod Dalton

Most growers in the area are holding an average to large crop now that most fruit drop has finished. There is a lot of sunburnt fruit. Growers are hoping the long talked about avocado oil plant in Brisbane will be ready to receive fruit in time for their harvest. There have been some losses to hail and my orchard does not have a piece of fruit on it following the frosts of the last two years.

The region has still not escaped the clutches of drought with many

water supplies still severely depleted. Although there has been useful rain through the season, runoff has been minimal. Thus there is some concern with fruit size and given the heavy crops the packouts may be disappointing.



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Avocado Promotions

By **Trudy Gosney**

Trudy is a Marketing Program Manager at Horticulture Australia

The 2004/05 marketing program was approved by the Industry Advisory Committee and Avocados Australia Limited Board in mid March. The program this year will once again underpin the avocado industry's Strategic Plan objective of increasing consumer consumption through advertising and promotion. More specifically, the focus of this year's marketing program will be on TV advertising, public relations (PR), point-of-sale (POS) and niche magazine advertising. See the campaign activity timeline below. The aim of the TV promotion, supported by public relations in-store promotion and other media advertising has been to change the consumer image of avocados from an occasional luxury to an everyday staple.

TV Advertising

The next burst of TV advertising for Brisbane is scheduled for early April through to May. Advertising in the other major markets will follow from late June through to mid July with the aim to support both green skin and Hass seasons. Sydney will have an additional spurt during April this year due to the large supply forecast at this time. Market indicators to date show that the advertising is having a lasting positive impact on avocado sales and consumer usage.

Public Relations

Public relations will feature heavily again during the 2004/05 program. Four media releases and new recipes are planned for distribution from March to September this year. The focus of this year's campaign will be international cuisine utilising avocados, namely Italian, Asian, Mexican and African. Once again the food media and women's magazines will be targeted.

In store Promotions

A new avocado recipe leaflet has been developed and will be distributed to many independent stores during March and May 2004, prior to the scheduled TV advertising. The leaflet features four new recipes, a seasonality chart for Hass and green skin avocados and information on how to select green skin or Hass avocados. In addition an in-store promotion is planned with Coles during May/June 2004. Woolworths is likely to also have in-store promotion during the season, with a feature in Fresh magazine possible.

Magazine Advertising

Niche magazine advertising will be implemented during 2004/05 to selected target markets. Publications such as Heartwise Journal and the Bounty Baby Care Book will emphasise the very important avocado health messages to health conscious consumers and new mum's to be, two very important and influential segments of the market. Publications such as these have proven to be a very cost effective way of educating consumers on the benefits of avocados.

Co-operative Funding

Once again a small sum of \$10,000 will be made available to assist state associations underpin the national campaign by promoting avocados at a localised level. A proposal outlining the activity complete with funding and timelines will need to be supplied for consideration. Proposals will be assessed as they are received, and therefore it is not envisaged that all proposals will receive funding. Please submit your proposals for consideration to Trudy Gosney at trudy.gosney@horticulture.com.au

Avocado Domestic Activity Timeline

March 2004 – February 2005

Avocado Campaign	Mar-04	Apr-04	May-04	Jun-04	Jul-04	Aug-04	Sep-04	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05
Week commencing (Mon)	1 8 15 22 29	5 12 19 26	3 10 17 24 31	7 14 21 28	5 12 19 26	2 9 16 23 30	6 13 20 27	4 11 18 25	1 8 15 22 29	6 13 20 27	3 10 17 24	7 14 21 28
Television												
Sydney												
Melbourne												
Brisbane												
Adelaide												
Header Cards (Coles)												
Leaflet												
Syd, Bris												
Melb, Adel, Perth												
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NUTRITIONAL INFORMATION

	per 100g	per 100g* serve
ENERGY	879kJ	1562.2 kJ
PROTEIN	1.9g	3.62g
FAT TOTAL	22.6g	40.6g
Saturated	6.3g	9.2g
Trans	nil	nil
Monounsaturated	2.7g	4.8g
CHOLESTEROL	14.7g	26.4g
CARBOHYDRATES TOTAL	nil	nil
Sugar	0.4g	0.8g
DIETARY FIBRE	0.4g	0.8g
SODIUM	1.5g	2.8g
POTASSIUM	2mg	3.6mg
IRON	470g	849mg
FOLATE	0.7mg	1.26mg (25.2%)
MAGNESIUM	17.9g	32.8mg (6.56%)
VITAMIN A	32mg	41.4mg (8.28%)
VITAMIN B1	49g	86.7g (173.4%)
VITAMIN B2	0.07mg	0.13mg (2.6%)
NIACIN	0.13mg	0.25mg (5.0%)
VITAMIN C	2.1mg	3.78mg (7.56%)
	9mg	16.38mg (32.76%)

Avocados relate to edible portion only * One whole avocado = 100g

Avocado Availability Chart



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Why is it still green?

varieties, Greenskin
always stay green. But that
an they're not ripe. To see
check if it feels soft at the stem end.
Look for Greenskin avocados all year
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Choosing a Hass is no hassle

It's no hassle picking the right time to enjoy
a Hass avocado. If the skin is tinged with green
and the stem end is hard, you've still got a few days to wait.
If it's turning purple and slightly soft near the stem end,
then your Hass has reached perfection. And if it's deepened
to purplish black and the stem end is soft, it's time to mash.
Look for Hass avocados all year round, with peak
season from May to November.

Love these avocados with all your heart

These unique fruits are also a source of B group vitamins,
folate, vitamins A and C, iron, and dietary fibre.
They are rich in monounsaturated fats,
and have the Heart Foundation's Tick
of approval. So skip the butter
and spread the avo instead.



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Avocado and pumpkin

Preheat oven to 200C.
Wash pumpkin, cut into 2cm thick slices.
Remove seeds, brush with olive oil.
Bake for 20-30 minutes until tender.
Meanwhile, cook salmon in a large pan with olive oil.
Season with salt and pepper.
Serve salmon with pumpkin and avocado.

Avocado dip

1 avocado
2 tablespoons olive oil
1/4 cup lemon juice
1/2 cup fresh coriander
Salt and pepper to taste

Smoked salmon & avocado salad baguette

- 1 slice baguette
- 1/4 cup olive oil
- 1/2 cup smoked salmon
- 1/2 cup avocado
- 1/4 cup fresh coriander
- 1/2 cup lemon juice
- 1/2 cup salted salmon
- 1/2 cup fresh coriander

Preheat oven to 200C.
Wash pumpkin, cut into 2cm thick slices.
Remove seeds, brush with olive oil.
Bake for 20-30 minutes until tender.
Meanwhile, cook salmon in a large pan with olive oil.
Season with salt and pepper.
Serve salmon with pumpkin and avocado.



Avocado dip served with crusty bread

- 1 avocado
- 1/2 cup olive oil
- 1/4 cup lemon juice
- 1/2 cup fresh coriander
- 1/2 cup salted salmon
- 1/2 cup fresh coriander

Preheat oven to 200C.
Wash pumpkin, cut into 2cm thick slices.
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Tour Report - Spain & South Africa



Report now available on the Australian avocado growers' tour of the South African and Spanish avocado industries during October 2003.

This comprehensive report titled "Study Tour of South African and Spanish Avocado Industries incorporating the Fifth World Avocado Congress in Spain" is now available for purchase from Horticulture Australia Ltd. The report was written by 22 of the tour members and consists of 116 pages illustrated with 74 photographs. Topics covered include:

- canopy management
- irrigation
- marketing
- packaging
- packhouses
- nurseries
- clonal propagation
- varieties
- site visits
- organic production
- sustainability



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Analysis of Canopy Management Options for Use in Avocados

By Marie Piccone

Marie is a horticultural consultant for Piccone PHC

This project was conducted by Marie Piccone, Piccone PHC during the period from May 2003 until January 2004 and was funded using avocado grower levies which are matched by the Federal Government through Horticulture Australia. A copy of the final report AV02006 is available from Horticulture Australia on 02 8295 2300.

Commercial avocado producers, industry bodies, researchers and advisers are constantly making decisions on a range of issues relating to canopy management. In order to make these decisions - many of which have far-reaching and major economic consequences for individual businesses and the industry - it is beneficial to determine the existing situation and any associated successes, problems and issues. There has been significant research in Australia and internationally regarding canopy management in avocados. The final project report includes a review of canopy management literature globally.

In Australia there are relevant case studies, and a significant amount of experience and knowledge. There are a number of case studies in various regions using a variety of systems that can provide some objective information to be used as a decision-making tool. Historically, this information has been 'scattered' and has not been collated and systematically analysed for use by the Australian industry.

This report is the result of investigation and analysis of commercial data from a wide range of sources and situations. The report suggests a methodology including a decision making system that outlines and compares various canopy management options. It provides analyses of case studies and canopy management options in terms of yield, costs and suitability of options to various regions and business situations. The analyses have been useful in revealing gaps in current information and systems and possible research and industry directions.

Developing an objective method to compare canopy management systems

This project aims to examine the productivity of case studies based on calculating the productivity rating which is a tonne of fruit harvested per hectare per year (t/ha/year) over an extended time frame. This is calculated by adding up the individual annual yields achieved per hectare then dividing this by the number of years of recorded data. The other productivity rating to be noted is the rating from planting to the present time which includes all years of the life of the orchard including the non-bearing years after planting before the first commercial harvest. There are not many commercial case studies - both in older and more recently planted orchards where data from planting to now is currently available.

The methodology seeks to provide this information along with a canopy management cost (\$/ha/year) which is calculated by adding up the total costs of canopy management activities in each year and then dividing it by the total number of years of records. It is important to note the length of the cycle recorded and the stage of the orchard during that recording. This provides meaningful background

information when interpreting and assessing the outcomes of the calculations.

Australian avocado producing regions and situations encompass an extensive range of production and commercial situations. Determining the relevance and suitability of various systems to particular situations and selecting the better and/or best strategies for a commercially optimum approach are high priority.

A wide range of case studies are documented and analysed in this project. Avocado producing regions of Australia can be divided into two distinct groups of regions in terms of canopy management possibilities. The first group of regions comprise those regions where the time from flowering to fruit maturity and harvest is one or several months less than 12 months. In these regions and localities, there is usually several months between the end of harvest and the beginning of flowering. This group includes the Atherton Tablelands, the Dry Tropics, Central Queensland including Childers, Bundaberg and Gayndah/Mundubbera, and the warmer regions of the Sunshine Coast, the Gympie locality and northern New South Wales.

The other group comprises those regions and localities where flowering to fruit maturity and harvest is more than 10 - 12 months and often the mature crop is still on the tree when the 'next' flowering is happening. These regions and localities are the cooler growing locations around Australia. The time from fruit set until fruit harvest is longer and flowering is 'later' in these locations. Based on these differences in the phenological crop cycle and the various marketing strategies that have developed as a response to market forces including supply and demand, there are certain criteria and issues that govern what avocado producers choose to do. This is a key issue in determining canopy management strategies and a major reason why avocado producers select various strategies depending on geographical location and marketing strategies.

The following examples extracted from the section on case studies show the analyses using the methodology explained above - by examining yield per hectare over time in conjunction with costs associated with the canopy management activities carried out. The result is an analysis of the yield per hectare per year over a recorded, stated number of years. Any changes in tree spacings as well as any special circumstances and/or comments that would have influenced/affected the outcome in terms of performance are noted.

A comparison of all the case studies (done to date) is shown in Table 1 to summarise the differences in results and commercial viability.



Case Study (i) Hedgerow Block in Central Queensland

Relevant Information

- Block size 3.4 hectares
- Leaf nitrogen 2.6 % (late autumn sampling)
- Variety 'Hass'
- Nitrogen fertiliser applications done in February, March, April and May annually

Below is an outline of the canopy management history of the block:

Years from Planting	Tree Spacing (m)	Canopy Management Activity	Additional Information
0		Block planted in July and August 1996	Prior to planting old trees were removed at a cost of approximately \$5 per tree.
4	9 x 5	-	
5	9 x 5	Trees hedged and shaped in August; Foliar spray of Sunny in September; spring flush trimmed mechanically in December	First shaping and mechanical pruning of trees
6	9 x 5	Trees hedged and reshaped in August; Foliar spray of Sunny (0.7%) in September of year 7 too late (comment from producer)	Yield reduced due to excessively hot summer and a shortage of water; trimming of spring in January
7	9 x 5	Spring flush trimmed back in January; trees hedged and shaped in August; foliar spray of Sunny in September; spring flush trimmed mechanically in December	Yield reduced due to lack of water and deterioration in water quality

The orchard is located in coastal Central Queensland. Hence the annual crop cycle (shown below) is compatible with a strategy incorporating mechanical pruning.

Crop Cycle	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Flowering												
Spring flush												
Summer flush												
Harvest												

Productivity Rating: 21.3 tonnes/hectare/year

Productive Years: 100% to date (4 out of 4)

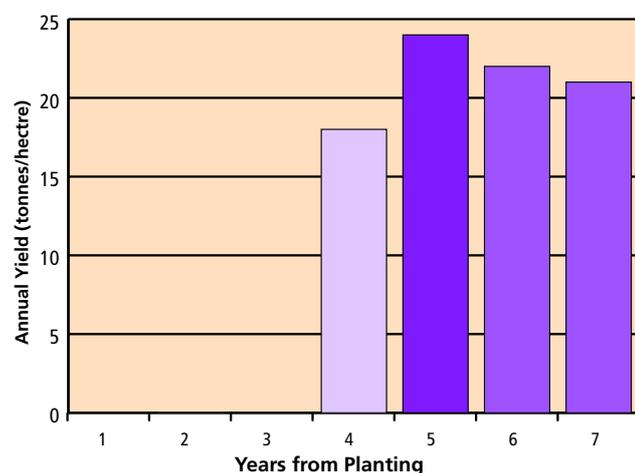
Length of Recorded Cycle: 4 year cycle to date

Canopy Management Cost: \$252/hectare/year

Future Canopy Management Plans:

Strategy comprising mechanical hedgerowing, use of growth regulators and removal of selective limbs to 'open windows in the tree canopies'.

Yields of Case Study (i) - CQ Hedgerow



Canopy Management Expenses Case Study (i) - CQ Hedgerow



Case Study (iv) Walkamin, North Queensland

Relevant Information

- Block size 2.4 hectares
- Leaf nitrogen level 2.2 % (late autumn sampling)
- Variety 'Shepard'
- Nitrogen fertiliser applications done in January, February, March, September, October, November & December annually.

Below is an outline of the canopy management history of the block:

Years from Planting	Tree Spacing (m)	Canopy Management Activity	Additional Information
	10 x 5	Block planted in 1992	
6	10 x 5	Outer limbs protruding into interrows were shortened to form a hedge. Dead wood was removed.	Interrow access was difficult and pruning was done for tractor access.
7	10 x 5	Outer limbs protruding into interrows were shortened to form a hedge. Dead wood was removed.	Yield data is recorded from 1999 harvest.
8	10 x 5	Mechanical pruning of sides done in July in part of block Selective limb shortening done from July to November in remainder of the block	Trees in good health and vigour.
9	10 x 5	Terminals were pruned manually in July and small center limbs were selectively removed.	Trees appear too large for spacing and there is lots of dead wood in them.
10	10 x 5	Terminals were pruned manually in July and small center limbs were selectively removed.	Trees still appear too large for spacing and there is lots of dead wood in them.
11	10 x 5	Half of each tree removed in early warm months of the year.	Yields for this harvest to be confirmed.

The orchard is located at Walkamin on the Atherton Tablelands in North Queensland. The annual crop cycle for 'Shepard' is shown below.

Crop Cycle	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Flowering												
Spring flush												
Summer flush												
Harvest												

Productivity Rating: 14 tonnes/hectare/year (mechanical pruning only in 2000)

18 tonnes/hectare/year (selective limb shortening only in 2000)

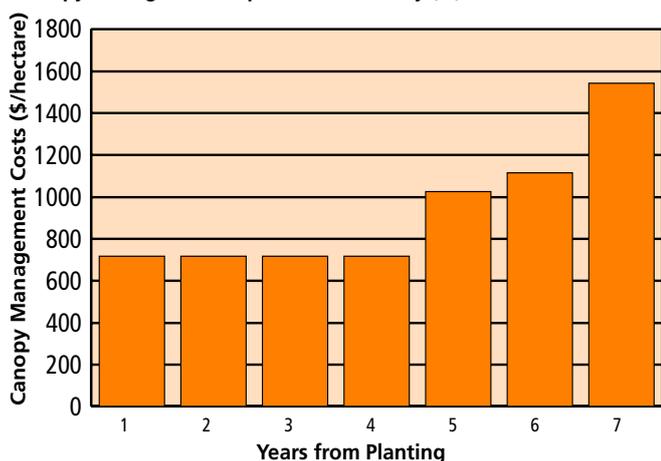
Length of Recorded Cycle: 4 years for yield (from year 8 to 10 after planting)

Productive Years: 100% (4 out of 4 from commencement of recorded data)

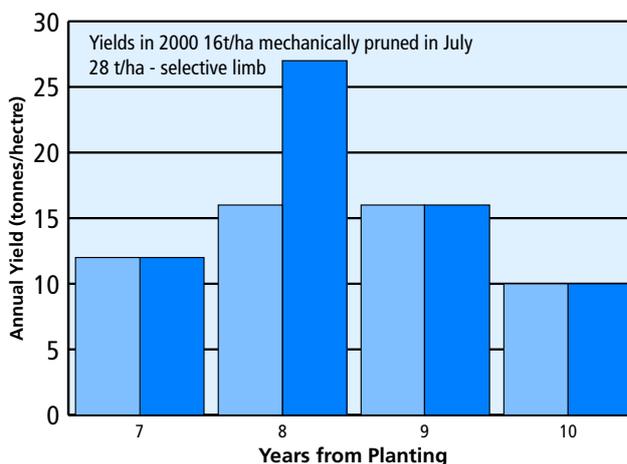
Canopy management Cost: \$940/hectare/year (over 7 years from 1998 to 2003)

Future Canopy Management Plans: Limb removal and then tree removal.

Canopy Management Expenses Case Study (vi)-Walkamin North Qld



Yields of Case Study (iv) - Walkamin North Queensland



Conclusions and Comments on Case Studies

Table 1 summarises the background and analyses of the canopy management case studies considered in the project. Based on the data and information collected and documented to date, the following observations are made:

- The information contained in individual case studies can be used by other avocado producers to evaluate the performance - to date - of various systems within their own region and in other 'similar' and 'different' regions of Australia.
- The system attempts to evaluate any particular system's performance over as long a period of time as possible (based on the data that has been recorded to date). This provides a more objective appraisal of the performance of various systems - rather than a discussion involving the '2 best years of data' or the '2 worst years of data'. At least 4 years of data are necessary to provide an assessment of long term performance and objectivity but the ultimate aim in using this system based on 'productivity ratings' and 'canopy management costs' is to analyse the first and second 10-12 year cycles of any specified commercial and/or case study planting.
- The appropriate length of the cycle will need to be decided as information from systems such as hedge rowing, manual pruning, selective limb removal, high density plantings and tree removal become available to be used to identify the length of 'cycles' and timeframe for activities.
- The highest productivity rating of 24.6 tonnes per hectare per year has been achieved using the manual pruning method in Case Study (xi).
- Medium to high yields i.e. 13 - 24.6 t per hectare are being achieved using various hedge rowing techniques, selective limb removal and manual pruning in many regions of Australia.
- Based on the case studies documented, stag-horning, top-working and transplanting of mature orchards each produced lowest productivity ratings.
- More case studies involving tree removal (and data over a sufficient amount of time) need to be found and documented to gain a better understanding of the comparative performance and suitability of Tree Removal systems.
- Plant growth regulators do not appear to be widely used based on the case studies documented and general impressions and information from industry. The reason for this is not yet clear.
- Results from Sunraysia case studies were influenced by severe frost issues and large fruit drops due to several years of extreme summer temperatures and low humidity causing excessive fruit drop. Yields in the case study blocks are increasing due to overhead misting used judiciously to reduce tree stress, fruit drop and to control frost.
- Several non-productive years in a cycle significantly influence the productivity rating. The 2 to 3 years from planting new trees to first commercial harvest or the 1 to 3 missed harvests after stag-horning, transplanting or top-working strongly impact on the productivity rating over extended timeframes.
- At this stage, it appears that the better performing systems are those that are designed to maintain a level of yield (some percentage of each tree or of the block producing) every year except from the initial 2 to 3 non-productive years after planting. Practically though there comes a time when the block must be reviewed for replanting.
- It may be useful to expand on the actual information gathered and collated by developing a model and extrapolating expected future results for some of the highly productive systems over longer periods of time. It may be useful to look at a model where the first 10 years of the orchard cycle are analysed (using expected yields and costs based on examples of real figures) and the second 10 years of an orchard cycle are also analysed based on predictions and expectations due to 'experience' and current records. The model is only an interim possible solution until more years of actual data are collected.
- In the longer term, continuing to collect data and observations over time will allow longer term analyses of the performance of the commercial case studies and trial sites.
- The canopy management costs appear higher in systems that involve tree removal and replanting - based on figures from the case studies. Canopy management costs are also relatively high for transplanting, some situations involving top-working, stag-horning and selective limb removal (the cost of mulching or removing the limbs and foliage are major components).
- It is interesting to note that the canopy management cost of some systems varies greatly within one region (eg canopy management costs for hedge rowing in Central Queensland range from \$252 to \$707 per hectare per year). Some of this variation is most probably due to the slightly different stages and requirements of each block and variety rather than different levels of efficiency of management. Comparisons of costs and efficiency are better done once a suitable 'cycle' length can be set and measured (probably 10 to 12 years) and the canopy management cost (\$ per hectare per year) determined over this longer period of time.
- The system may provide a basis for providing cost effective research and development information that encompasses every avocado producing region of Australia. Using case studies, commercial research trial sites and benchmarking, this methodology can be used to analyse a range of systems and combinations simultaneously.
- While management of various orchards differ, the management practices of the producers involved in the case studies indicate that they are all within the range of 'best practice' and within the bounds of suitable research sites that would generally be selected for canopy management research.

Recommendations

Based on the objectives of the project and those outlined by the participants at the Avocado Canopy Management Workshop (a diverse group of producers and other industry key players) and the findings of this project to date, the following recommendations are suggested for considerations:

- The AAL consider using this case study/benchmarking process based on productivity ratings (tonnes per hectare per year), canopy management costs (dollars per hectare per year) and eventually data from 10-12 year cycles to compare canopy management strategies.
- The system can also be used to continue to identify the most productive and efficient system/s to suit various circumstances i.e. crop cycles and harvest dates, varieties, regions.
- An approach based on benchmarking case studies that is co-ordinated and analysed by an experienced canopy management researcher is suggested as a means of providing extensive and objective information more rapidly than the traditional research approach.
- Based on the current case study results using hedge rowing, it would be useful to maintain the current line of research in Central Queensland as one of the case studies.
- In order to support research (as this entire concept is 'breaking new ground' in avocados and undoubtedly will require further development), it is recommended that a group with relevant experience meet regularly to develop the concept further and discuss the findings of case studies.
- The ongoing canopy management research be based on long term documentation of case studies including detail about exact activities and timing (which was often difficult to obtain in this project as participants had no prior knowledge of what would be required). It would be useful to provide co-operators with a system of recording raw information as it is generated so that the collection of data is as easy and efficient as possible. A section in 'AVOMAN' is a possible avenue for recording the required data.
- Selected co-operators could be targeted to 'trial' new and/or potentially successful systems so that 'trials' on the range of potentially 'best practice' systems are being conducted in each of the major avocado producing regions.
- It is also recommended that eventually the system be expanded to include the cost of planting (in all future situations) and replanting (where applicable) in the analyses of canopy management costs.
- Further development is needed to devise a method of calculating the differences in profit of individual producers using various systems and based on different returns per tray or unit (dependent on the time of marketing and a range of other market driven factors and circumstances).
- Currently, avocado producers can use the data provided and their own figures on prices and returns to calculate their own profitability based on different productivity ratings, canopy management costs and returns per unit. They can also use their own data and benchmark their results against the results of the case studies summarised in Table 1.

A HOME FOR YOUR REJECTS

Natures Fruit Company ("NFC"), in conjunction with Olivado International Ltd ("Olivado"), will shortly be seeking to source your process grade (reject) avocados.

Olivado's processing plant is likely to be operational by June and we therefore should start taking avocados from early May.

East coast growers will shortly receive documentation from us about this exciting initiative. Growers in other parts of Australia will receive documentation closer to the relevant harvest time. The documentation will include payment details, product specification and receival points etc.

We look forward to your support of this venture.

Bryan Raphael
NFC

Chris Nathan
Olivado



Table 1 summarises the background and analyses of the canopy management case studies considered in this project.

Case Study	Region	System Component/s	Variety	Stage of Orchard	Length of Recorded Cycle (years)	Productivity Rating (t/ha/yr)	Productivity from planting to now (t/ha/yr)	Canopy Management Cost (\$/ha)	Relevant Additional Information
(i)	Central Qld	Hedgerow	Hass	Years 4 - 7 after planting	4	21.3	12.2	25	Yield data was kept from year 4 after planting.
(ii)	Central Qld	Hedgerow	Shepard	Years 8 - 14 after planting	7	13.7	not known	707	Yield data was kept from year 8 after planting.
(iii)	Central Qld	Hedgerow	Hass	Years 6 - 11 after planting	13.6	not known	442		Yield data kept from year 6 after planting. Low yield in year 10 due to boron toxicity problem.
(iv)	Nth Qld	Terminals and limbs pruned	Shepard	Years 6 - 11 after planting	5	14 & 18	not known	940	Yield data kept from year 6 after planting. Yield data for year 11 not yet available. Lower yield of 14t/ha where trees mechanically pruned.
(v)	Sunraysia	Terminals and limbs pruned; PGRs; Tree Removal	Hass	Planting to year 8	8	5.5	2.8	317	Frost and fruit drop due to extreme summer conditions affected yield data. Canopy management cost includes pruning in years 1, 2, 3, and 4 due to frost damage.
(vi)	Sunraysia	Terminals and limbs pruned; Tree Removal	Hass	Planting to year 8	8	9	4.5	262	
(vii)	Sunraysia	Staghorn/topwork; limb pruning	Topworked to Hass	Year 22 to year 29	8	10.6	not known	887	
(viii)	SE Qld	Tree removal	Hass	Years 6 to 10	5	11.9	not known	675	
(ix)	SE Qld	Staghorns transplanted	Hass	Years 6 to 10	5	3.6	not known	1214	Trees starting to crowd in year 10.
(x)	SE Qld	Terminals and limbs pruned	Hass	Trees older than 15 years	4	9.75	not known	123	
(xi)	WA	Terminals pruned	Hass	Years 9 to 15	7	24.6	not known	750	
(xii)	WA	Staghorned; terminals pruned; cinctured	Hass	Trees about 20 years old when staghorned	4	4.7	not known	1823	Block was overcrowded before trees were staghorned.
(xiii)	WA	Limb removal; pruned; staghorned; terminals tree removal; replanting	Hass	Trees about 20 years old in yr 1 of records	5	15.6	not known	1112 (& 4160)	
(xiv)	WA	Terminals pruned	Hass	Planting to yr 6	6	10.5	6	510	
(xv)	WA	Limb removal	Hass	Year 17 to 22 (approx)	5	19	not known	800	
(xvi)	WA	Limb removal; terminals pruned;	Hass	Trees about 16 to 25 years old	6	18	not known	400	
(xvii)	SW WA	Staghorned; PGRs; Tree removal	Hass	Years 9 to 18 after planting	9	6.8	not known	334	Nitrogen fertiliser was applied in all years after staghorned.
(xviii)	SW WA	Terminals pruned; PGRs	Hass	Years 9 to 15 after planting	6	16	not known	446	
(xix)	Nth Qld	Terminals and limbs pruned	Hass	Years 6 - 10 after planting	4	21.5	not known	662	Yield data kept from year 6 after planting. Yield data for year 10 not yet available.

United States-Australia Free Trade Agreement

The following is a summary from the full text of the Draft US-AUST FTA. The full agreement is over 1000 pages long and contains enormous detail. The point to note is that this is a “Draft, Subject To Legal Review for Accuracy, Clarity and Consistency”. The enacting of this agreement requires passing through the Australian Parliament and the US Congress. Until that time it remains just a document and no more.

Avocados are only one small section of the document. According to the document we will receive a tariff free quota of 4000 metric tons per year, broken into two parts, 1500 metric tons during 1 February to 15 September and 2500 metric tons between 16 September to 30 January. For more detail please see Table 1.

It is important to realise that this does not mean Australia can export avocados to the US. Australia does not yet have quarantine access to the US. When we are eventually able to send avocados to the US, the US-FTA will save approximately 11% in tariffs.

For more information on the US-FTA go to: http://www.dfat.gov.au/trade/negotiations/us_fta/text/index.html

Year	1 Feb to	16 Sept to
	15 Sept	30 Jan
	Quantity	Quantity
	Metric tons	Metric tons
1	0	0
2	1,500	2,500
3	1,650	2,750
4	1,815	3,025
5	1,997	3,328
6	2,196	3,660
7	2,416	4,026
8	2,657	4,429
9	2,923	4,872
10	3,215	5,359
11	3,537	5,895
12	3,891	6,484
13	4,280	7,133
14	4,708	7,846
15	5,178	8,631
16	5,696	9,494
17	6,266	10,443
18	unlimited	unlimited

Table 1. Summary from: ANNEX 2-B Schedule of the United States General Notes: Tariff Schedule of the United States

South Australian Meeting Notice

The AGM of the South Australian Avocado Growers Association Inc. will be held on Thursday, 6 May, in the Waikerie Hotel starting at 9am.

The guest speaker for the day will be *Marie Piccone*. Marie has just finished a project for the Australian Avocado Industry entitled, “*Canopy Management Options for use in Avocados*”. Included in the discussion will be ways to control biennial bearing. Field visits will be conducted after lunch followed by a BBQ and drinks.

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Apology

We wish to apologise for the incorrect statistics reported in the Summer Issue of Talking Avocados (Vol 14 No.4). We are working with Horticulture Australia to correct the information.

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The Passing of a Former AAGF Director, Tony Lawrence

It was with sincere sadness the Avocado Industry learnt of the passing of Cudgen Avocado grower, Tony Lawrence. Our deepest sympathies go to Chris, Tony's wife and his family.

Tony was involved in the Avocado industry for over 25 years. He was an integral part of the NSW and Australian Committees, being a director of AAGF for approximately 8 years during the 80's and 90's. He was a current member of the NSW Avocado Association, a position that he had held for 16 years.

Tony will be remembered for his positive contributions to the Industry, his ability to listen, his preparedness to represent growers at meetings and his ability to make the Industry more profitable. He was always willing to travel to different growing areas to seek out new ideas that he could trial and share with fellow growers.

We will also remember him as the professional barbecuer serving expertly cooked native Australian meats to our International Avocado guests at Anderson's farm, Duranbah.

I will dearly remember his smile and cheeky remarks.

Many thanks, Tony.

By Peter Molenaar AAL Director Northern NSW.

ANVAS ACCREDITED NURSERIES

ANVAS accredited trees can be purchased from the following nurseries:

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Schulz Road,
Woombye Qld
Ph: 07 5442 1657

Birdwood Nursery

Peter & Sandra Young
71-83 Blackall Range Rd
Nambour Qld
Ph: 07 5442 1611

Rainforest Nursery

Ron & Joan Knowlton
25 Reynolds St
Mareeba Qld
Ph: 07 4092 1018



Avocados Australia Limited Board of Directors Election

The Avocados Australia Limited (AAL) full Board election will take place during the period 30 April to 30 June 2004 (see Figure 1 for the important dates). During this period members of AAL will have the opportunity to nominate and vote for their area's representative on the AAL Board. The "Growing Area" borders have been determined by production, as per the AAL Constitution (available at www.avocado.org.au). There will be eight "Growing Areas" and nine Directors. The "Growing Areas" are

1. North Queensland
2. Central Queensland (two Directors)
3. Sunshine Coast
4. South Queensland
5. North New South Wales
6. Central New South Wales
7. Tri State
8. Western Australia/Northern Territory

Voting in the election is only open to members of AAL. Any commercial avocado grower is entitled to apply to become a member of AAL. If you have not already joined, please complete and return your membership form in this issue of Talking Avocados or visit our website www.avocado.org.au for more information and membership forms.

ELECTION TIMELINE



Fifth World Avocado Congress Report

Spain 19-24th October 2004

by Tony Whiley,
Antony Allen
and Jay Anderson

Highlights from the World Congress were:

- a yield response is claimed following the application of calcium/magnesium silicate to avocado trees in Mexico;
- information was presented on 'Harvest' which is a new 'Hass'-like cultivar from the UCR breeding programme;
- rootstocks with greater Phytophthora root-rot tolerance have been identified in the Canary Islands;
- 'Velvick' continues to be in the top bracket of rootstocks tested in subtropical South Africa with respect to production and Phytophthora root rot resistance;
- rootstocks imparting high productivity have been identified in Israel;
- advances have been made in the use of molecular biology in avocados with 'Velvick' being identified as belonging to the West Indian race;
- the presentation by Australia's Jay Anderson on "the effect of rootstock and nutrition on development of postharvest anthracnose in Hass";
- the extensive marketing workshops and program.

Mineral nutrition

There were eight papers presented on mineral nutrition at the Congress. This session in general was disappointing, as most of the data reported has previously been established for avocados. The exceptions were results reported on nursery trees that showed the use of monthly applications of humic acid at 6 g/l significantly improved root and shoot growth; and the application of silicate increased the yield of fruiting avocado trees. The silicate was applied as Ca/Mg silicate at the rate of 10 kg/tree to 4-5 m diameter trees split into two



*V World Avocado Congress, from left to right:
Australians Jay Anderson (QDPI&F researcher), Graham Anderson
(nurseryman and grower) and Henry Kwaczynski (grower)*

applications: one month prior to flowering and the second two months after flowering. Anatomical studies carried out on silicate-treated trees also demonstrated that cell walls in leaf and shoot tissues were thickened.

After oxygen, silicon is the most plentiful element on our planet, although it is interesting that it has never been shown to be an essential nutrient for plant growth under non-limiting conditions. Nevertheless, production gains have been recorded for several crops where silicates have been applied, e.g. rice, sugar cane and cucumbers. It is interesting to note that growth/yield responses have only been recorded when the crop is under some type of stress, e.g. salinity, toxic nutrient levels, disease, etc. Silicon (silicate) absorbed by roots is translocated in the transpiration stream and deposited in cell walls causing thickening. Once incorporated into tissues it does not move hence a continuous supply is needed while plants are growing. The result on the use of silicon on avocados reported at the Spanish world avocado conference should not be ignored since many of our orchards are growing under stress conditions whether it be due to salinity or disease and benefits may accrue from the programmed use of silicates. Not all silicate sources are appropriate and further research should be carried out to establish potential benefits and to identify the most appropriate products to use. The Australian Industry's research team that is focussing on plant pathology is intending to study the application of silicon (silicate) to avocados during the next funding cycle beginning mid-2004.

Flowering and Fruit Set

The 10 papers presented in this session discussed issues such as "wind" pollination for 'Hass', the effect of 'Bacon' polliniser limbs in 'Hass' trees growing in California, girdling/cincturing 'Hass' trees in California to increase yield in "off" years and the effect of uniconazol-P (Sunny®) on 'Hass' yield in Chile.

There was no conclusive data presented that demonstrated that wind was an effective agent for the pollination of avocados. It was generally agreed that insects (particularly bees) were the main agents for the transfer of pollen during flowering. In coastal California the presence of 'Bacon' (B-type flower) limbs in 'Hass' (A-type flower) trees increased fruit yield in some years. Nevertheless, it was considered commercially viable to include pollinisers in 'Hass' orchards at this location.

In Chile, 'Hass' orchards are inter-planted with 'Edranol' in a ratio of 1 in 5 trees to provide pollen for 'Hass' during flowering. Despite losing 20% of the orchards trees to pollinisers, 'Hass' production in well-managed orchards averages an acceptable 14-18 t/ha. The equivalent of July-applied cinctures to one third of the limbs of 'Hass' trees increased fruit numbers but decreased fruit size over three consecutive years in California while in Chile autumn-applied Sunny® at either 0.5 or 1% significantly increased yield (up by 53%) on young 'Hass'

Fifth World Avocado Congress Report
continued



V World Avocado Congress, during the Marketing Forum, from right to left: Grower representatives from Australia Antony Allen, Chile Alfredo Dabancens, Peru Bruno Carlini and Argentina Horacio Frias,

During the week of the 19th October 2004 approximately 1000 delegates assembled at the Costa del Sol Convention Centre, Torremolinos, Spain for the V World Avocado Congress. Delegates represented all major production countries of the world as well as countries with significant avocado imports, including France, Great Britain and Japan. The official languages of the Congress were English and Spanish with simultaneous translations provided during the presentation of papers and the discussions that subsequently followed.

The program covered both preharvest and postharvest aspects of avocados over the five days of the Congress with papers on genetic resources, molecular markers, biotechnology, ecophysiology, mineral nutrition, irrigation, reproductive biology, growth regulators, cultural management practices (including organic production), propagation and nursery practices, rootstocks and varieties (breeding), pests and diseases, postharvest, domestic and international marketing and human nutrition and health. Additionally workshop sessions were held on the following topics: "Control of soil fungi diseases", "Pollination", "Pruning", "Marketing", "New cultivars" and "Mineral nutrition".

A meeting of the "World Avocado Marketing and Promotion Working Group" was held in conjunction with the Congress with the following countries represented at the meeting: South Africa, Kenya, Australia, New Zealand, Israel, USA, Spain, Peru, Chile, Argentina and Mexico. The AMAPWG meeting discussed world avocado flows and the refining of an information system that allowed the sharing of avocado flow information.

Antony Allen presented the Australian Industry Report to the Congress and participated in the marketing forum. Most producing countries outlined their production, export, promotion and marketing strategies. What appears to be very clear from the Congress Country Reports is that, with the exception of Israel, production is rising in all countries, in particular new producing countries such as Chile and Peru. (see Table 1)

COUNTRY	TONS (M)	4 KG CE (M)	TONS (M)	4 KG CE (M)	TONS (M)	4 KG CE (M)
UOM	2002		2004		2007	
ARG	0.30	0.08	0.30	0.18	0.00	0.15
AUS	0.00	0.00	0.00	0.00	0.00	0.00
CHI	3.00	0.90	7.20	1.80	27.50	6.88
ESP	34.00	8.30	34.00	8.50	34.00	8.30
ISR	0.00	2.00	11.00	2.75	14.00	3.50
KYA	2.00	0.50	4.00	1.00	10.00	2.30
MEX	7.50	1.88	7.50	1.88	7.50	1.88
MOR	0.00	0.00	1.00	0.25	4.00	1.00
PER	0.00	0.00	0.25	0.06	0.30	0.13
PER	10.00	2.50	17.50	4.38	22.00	5.50
RSA	15.20	3.80	17.90	4.45	25.40	6.35
TOTAL	80.6	20.2	101.0	25.2	145.5	36.4
% INCREASE ANNUAL	24.1%		25%		41%	

COUNTRY	TONS (M)	4 KG CE (M)	TONS (M)	4 KG CE (M)	TONS (M)	4 KG CE (M)
UOM	2002		2004		2007	
ARG	0.0	0.0	0.0	0.0	0.0	0.0
AUS	0.0	0.0	0.0	0.0	0.0	0.0
CHI	0.0	0.0	0.0	0.0	0.0	0.0
ESP	9.0	2.0	9.0	2.0	9.0	2.0
ISR	30.0	5.0	34.0	8.5	37.0	9.3
KYA	30.0	5.0	30.0	5.0	30.0	5.0
MEX	0.0	0.0	0.0	0.0	0.0	0.0
MOR	0.0	0.0	0.0	0.0	0.0	0.0
PER	0.0	0.0	0.0	0.0	0.0	0.0
PER	0.5	0.1	0.7	0.2	0.7	0.2
RSA	19.2	4.8	17.8	4.5	20.8	5.2
TOTAL	87.7	16.9	96.5	20.1	96.5	21.6
% INCREASE ANNUAL	10.5%		10%		1%	

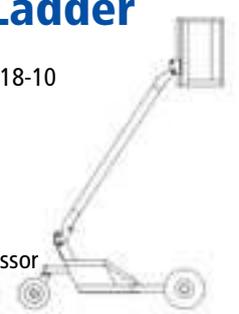
Table 1. World AMAPWG Volume Projection 2002 to 2007 (courtesy of South African Avocado Growers' Association for the World AMAPWG)

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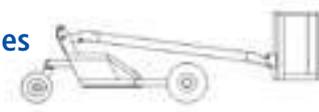
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*Fifth World Avocado Congress Report
continued*



V World Avocado Congress during a session break.

10'. Excess nitrogen fertilizer also increased postharvest anthracnose. Fruit that have high nitrogen levels and high nitrogen to calcium ratios in their skin develop more anthracnose during ripening.

White root rot causes a great deal of damage in orchards in Israel and Spain. White root rot is caused by the fungus *Rosellinia necatrix* (also called *Dematophora necatrix*). The fungus lives on old roots in the ground and can infect the avocado tree when the feeder roots come into contact with the fungus. It has been found in orchards in California, Israel and Spain but has never been recorded in Australia. The papers presented at the congress described Spanish research aimed at selection of tolerant rootstocks, finding effective chemical control and the biological control of white root rot using *Pseudomonas*.

Most of the research being conducted to control *Phytophthora* root rot is directed towards breeding for resistant rootstocks as described above. In South Africa the Ocean Agriculture chemical company has developed a new phosphorous acid formulation (Avoguard 500 SL). A representative from Ocean Agriculture claimed that Avoguard 500 SL improved tree recovery rate and has decreased phytotoxicity. The representative did not reveal the chemical composition and the

company's website lists the ingredients as potassium phosphite and a phosphorous acid equivalent.

The overall success of the V World Congress was a testament to the Spanish Organising Committee. The Congress provided a wonderful venue for the exchange of ideas and the developing of networks for both growers and researchers. We look forward to seeing even more than the 80 plus Australian delegates that attended the V World Congress at the VI World Congress in Chile in 2007. If you would like more detailed information on the papers presented at the Congress please go to www.avocado.org.au/growers/grower_links/ or contact the AAL Office for a CD of the Conference Abstracts and Proceedings.

Tony Whiley's and Antony Allen's industry representation at the V World Avocado Congress was undertaken using avocado grower levies which are matched by the Federal Government through Horticulture Australia. Jay Anderson's travel was funded by the Cooperative Research Centre for Tropical Plant Protection and the University of Queensland and QDPI&F.

Fifth World Avocado Congress Report continued

trees coming into their first fruiting season.

Varieties and Rootstocks

Thirteen papers were presented at the Congress in the area of genetic improvement as it relates to evaluation of new varieties and rootstocks.

'Harvest' a 'Hass'-like variety from the UCR breeding programme, has been evaluated for several years in subtropical South Africa where it has been shown to consistently out-perform 'Hass' by 125%. The variety ripens to a black skin and matures slightly later than 'Hass'; however, some caution with the commercialisation of 'Harvest' is warranted due to fruit quality issues (e.g. a high incidence of vascular browning during one year following frosts in the experimental orchard suggesting poor tolerance to low temperatures). Arrangements have been made to import 'Harvest' to Australia for experimental testing. '3-29-5' is another 'Hass'-like variety from the UCR programme which is also out-performing 'Hass' in subtropical South Africa (by about 20% over 3 years). Maturing slightly later than 'Hass' it ripens to a black skin with high quality flesh. This variety has already been imported under licence into Australia and field evaluation will begin once it is released from quarantine.

Results were presented from subtropical South Africa on rootstock evaluation where 'Hass' has been grafted to a number of cloned rootstock lines and grown without fungicidal support in a Phytophthora-infested soil. The results show that over time the health of all trees declines and this is independent of the rootstocks used. Thus, to date only some tolerance to Phytophthora root rot in avocado rootstocks has been found and where Phytophthora is present orchards will require additional management strategies to maintain trees in a healthy state. The three best rootstocks reported from the Westfalia experiment are 'Merensky II' ('Dusa'), 'Merensky III' and 'Velvick'. Within this group of three rootstocks there was no difference in tree health four years after planting while 'Merensky II' (22.4 kg/tree) and 'Velvick' (22.8 kg/tree) had higher cumulative yields than 'Merensky III' (17.5 kg/tree).

Research from the Canary Islands also reported on progress with



*V World Avocado Congress, from left to right:
Gloria and Nigel Wolstenholme (South African researcher) and
Tony and Dorothy Whiley (Australian researchers)*

Phytophthora-tolerant rootstocks. In field trials with cloned rootstocks grafted to 'Hass' and planted in Phytophthora-infested soil five rootstocks were more tolerant to Phytophthora root rot infection than 'Duke 7'. The best three rootstocks were SS3-1 (West Indian), Maoz H5-B6 (a seedling selection of Maoz - West Indian) and Gema (Guatemalan x West Indian hybrid). Negotiations are being carried out to import these three rootstocks into Australia for evaluation under local conditions.

Israeli research has indicated that the most productive 'Hass' trees in field experiments were 'Hass' cuttings or 'Hass' grafted to cloned 'Hass' rootstocks. However, these trees only out-performed 'Hass' on other rootstocks until the effects of salinity overcame tree health (the quality of irrigation water in Israel is deteriorating due to the demands of urbanisation). The two rootstocks consistently giving high yields over a longer time frame were VC 51 and VC 57. Access to these rootstocks to test in Australia is currently being negotiated.

Diseases

Most papers presented on research into diseases were on anthracnose (9 papers) and white root rot (4 papers). Other papers described work on Phytophthora root rot (2 papers), and chemical control of Cercospora spot (1 paper).

The work presented on understanding and controlling anthracnose was varied and examined both preharvest and postharvest control of the disease. Kerry Everett from New Zealand described her work on finding the best way to quantify the amount of inoculum in an orchard. The long-term aim of the project is that a method can be developed to select fruit for export from orchards that have low levels of Colletotrichum and hence are likely to have low levels of anthracnose.

Henry Pak presented two papers on research being carried out in New Zealand. He described the findings from a study on the impact of rainfall prior to harvest on ripe fruit quality of 'Hass' in New Zealand. The study showed that a small amount of rain (5mm in 24 hours) before harvest can cause fruit to be susceptible to lenticel damage and increase the likelihood of postharvest anthracnose. Fruit susceptibility to lenticel damage decreases in around 24 to 72 hours after rainfall ceases. There is not a simple relationship between an increase in rain and a decrease in quality - rain over 48 hours or longer can make the fruit less susceptible to fruit diseases, possibly by decreasing the inoculum in the orchard.

Dr Pak also presented results on the influence of maturity on fruit quality in New Zealand 'Hass'. In this work it was shown that fruit with greater than 24% dry matter (DM) ripened more evenly, had fewer vascular strands and a lower incidence of fruit disease.

Jay Anderson presented a paper on the effect of rootstock and nutrition on development of postharvest anthracnose in 'Hass' growing in subtropical Australia. Fruit from 'Hass' trees grafted to Mexican race rootstocks ('Duke 6', 'Parida 1') had significantly more anthracnose than fruit from 'Hass' grafted to 'Velvick', 'Anderson 8' or 'Anderson

The Importance of Correctly Sampling Avocado Fruit for Maturity Testing

By Peter Hofman and Pat O'Farrell

Avocados reach a stage during their growth when they can be picked and will ripen to an acceptable quality after harvest. At this stage of development the fruit is said to have reached harvest or horticultural maturity. If harvested before this stage, avocados can have unacceptable eating quality, can shrivel while softening, can soften unevenly, and often have more rots. Therefore, it is important to identify the minimum maturity that ensures acceptable quality when ripe, but that allows early harvesting to access the higher early season prices if required.

Determining harvest maturity

The most reliable method of determining harvest maturity is to pick a sample of fruit from the intended harvest and determine if it ripens to acceptable quality. However, this is time-consuming and the opportunities for early marketing may be lost. Therefore, a lot of work has been done to determine other fruit characteristics that indicate the point of earliest acceptable harvest. These characteristics (often called

Peter is a Senior Principal Horticulturist for QDPI&F
Pat is a Senior Experimentalist for QDPI&F

maturity standards) are generally developed by comparing the fruit attributes (size, shape, skin or flesh colour etc) with quality when ripe. However, because of fruit variability and the influence of growing conditions, these fruit characteristics will not always be a reliable indicator of maturity. The challenge is to obtain a balance between speed and cost of measuring the fruit characteristic, and its accuracy as an indicator of final fruit quality. With avocados, the difficulty in attaining this balance has stimulated much research.

Dry matter as a harvest maturity standard

Researchers realised in the early 1900's that avocado fruit oil content is a good and reliable indicator of maturity, and oil content is still the best guide available today. Unfortunately traditional techniques for measuring oil content are expensive. The amount of moisture in the flesh (also indicated as the percentage of dry matter) is cheaper to measure, since it only requires weighing a subsample of the fruit flesh, drying the sample in a dehydrator, oven or microwave to remove all the moisture, then weighing the sample again (refer to the Avocado Agrilink Manual for full details). Percentage dry matter has been adopted by most avocado producing countries as the harvest maturity standard, but it is less reliable than oil content and is influenced more by growing conditions.

With any maturity standard, there are several requirements for it to be effective:

- It must be a good indicator of maturity.
- The minimum level set for the standard must be appropriate. The Australian avocado industry has accepted 21% dry matter as the minimum harvest maturity standard.
- The sampling procedures for obtaining fruit for the test must be adequate. There are differences in fruit quality and maturity between fruit on the same tree, and also differences between trees. Fruit samples must represent the average of those to be harvested.
- Handling procedures between harvest and the test should ensure that moisture loss from the fruit is minimised.

The effect of fruit sampling on dry matter accuracy

Concerns have been expressed over the inconsistent quality of 'Shepard' fruit on the market this year, especially at the start of the season. It is likely that at least part of the cause of this problem related to the harvest of immature fruit, since this fruit often takes longer to ripen and develops more rots. From what is known about the factors that influence fruit maturity, it is likely that the method used by growers to sample fruit for maturity testing is one reason why immature fruit were harvested. This opinion is based on information from research

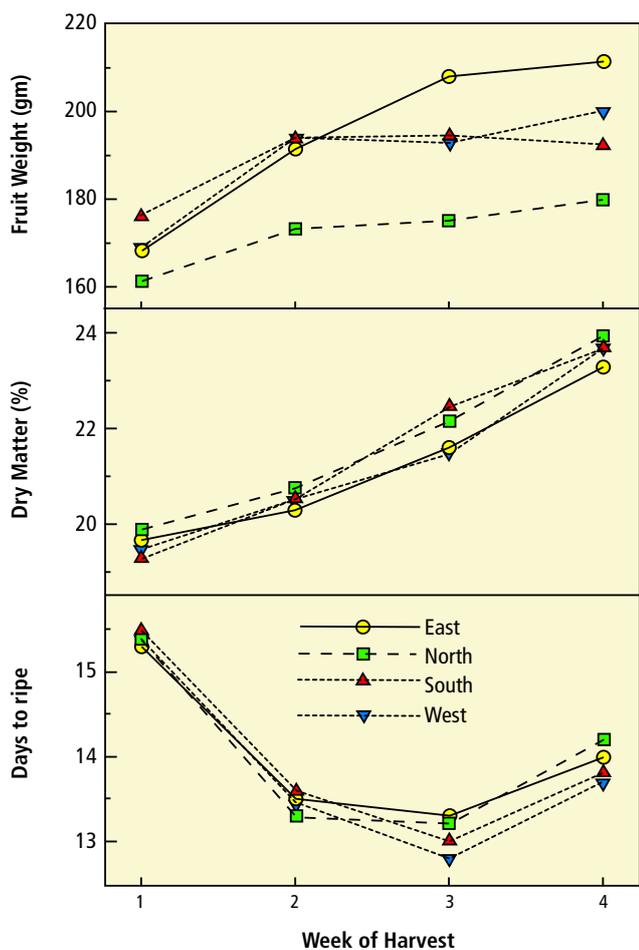


Figure 1. 'Hass' avocado fruit were harvested from four aspects of the tree (east, north, south and west) at fortnightly intervals for four harvests. The fruit were weighed, and the percentage dry matter and days from harvest to eating soft determined.

The Importance Of Correctly Sampling Avocado Fruit For Maturity Testing
continued

conducted in 1996 which investigated various factors influencing fruit maturity, and information gathered this year from samples submitted to QDPI&F by growers for maturity testing. A summary of the 1996 research is presented here, with a full report available from HAL.

The effect of aspect

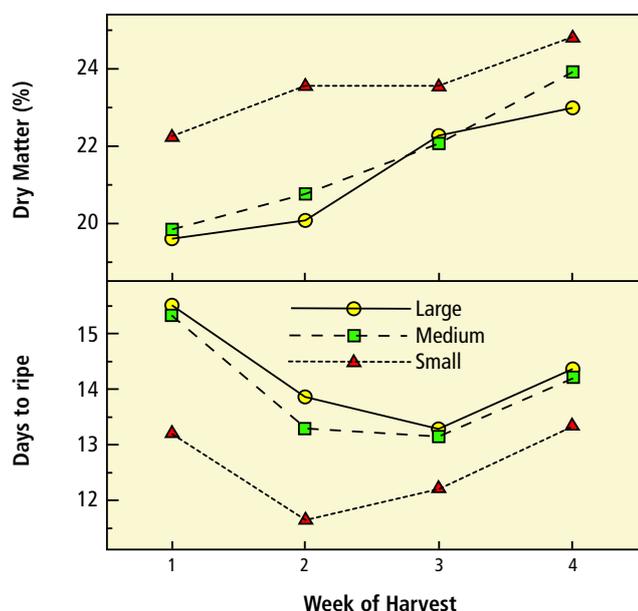
As part of the research program, avocado fruit were harvested at fortnightly intervals from the north, south, east and west aspects of 10 trees. Figure 1 shows that aspect did not affect the percentage dry matter of the fruit. Aspect also had no effect on the ripening pattern of the fruit. Other studies in south east Queensland have also shown that aspect has little effect on avocado percentage dry matter.

The effect of fruit size

During the same four harvests, fruit of three sizes were obtained from the northern side of 10 trees. These averaged about 100, 170 and 210 gm for small, medium and large fruit respectively, over the four harvests. The results indicate that the small fruit had higher percentage dry matter at all harvests (see Figure 2). Results from South Africa have also indicated that smaller 'Pinkerton' fruit have a higher percentage dry matter because these fruit flowered first, grew slower during the colder spring, and therefore were smaller but more mature at commercial harvest.

The smaller fruit also ripened more quickly, again indicating that they were more mature.

Figure 2. Small, medium and large 'Hass' avocado fruit were



harvested at fortnightly intervals for four harvests. The percentage dry matter and days from harvest to eating soft is presented.

The effect of fruit damage

At one of the harvests, fruit affected by ringneck and "sunburn" were harvested. Table 1 shows that the damaged fruit were smaller, had a higher percentage dry matter and ripened more quickly.

Characteristic	Damage symptom		
	Undamaged	Ring neck	Sunburn
Fruit weight (grams)	182	129	158
Percentage dry matter	21.35	22.60	22.91
Days to eating soft	12.86	11.56	10.27

Table 1. The effect of fruit injury on fruit weight, the percentage dry matter, and the number of days from harvest to eating soft, of 'Hass' avocados.

Variability between fruit and between trees

In all of the above experiments, the trees from which the fruits were harvested had a significant effect on the percentage dry matter of the fruit, and the rate at which the fruit ripened. For example, at the last harvest, fruit from one tree had an average of 22.2% dry matter, and fruit from another tree, an average of 24.6% dry matter. Also, at the same harvest, medium size fruit from one tree had dry matter ranging from 20.6% to 25.2%.

The results of the Shepard fruit submitted by growers to QDPI&F for dry matter testing this season illustrates this point. Table 2 shows that when the fruit were analysed separately, the percentage dry matter varied from 18.1% to 27.3% in sample 3. When the 5 fruit were combined and analysed as one sample (current recommended procedure), the result was 22.6%. On this basis the fruit would have been considered commercially mature, despite the fact that 40% of the fruit (two of the five fruit) were below the 21% standard.

Sample	% dry matter	
	Standard test (fruit analysed together)	Individual fruit
1	22.3	19.8
		21.5
		26.7
		19.5
		26.2
2	23.4	25.9
		22.9
		22.7
		24.4
		20.4
3	22.6	25.3
		19.7
		18.1
		27.3
		22.7

Table 2. Examples of DM results of Shepard fruit submitted to DPI&F for testing in 2004.

The Importance Of Correctly Sampling Avocado Fruit For Maturity Testing
continued

Conditions after harvest

Storage conditions between harvest and dry matter testing may affect the percentage dry matter result, especially if these conditions result in a loss of moisture from the fruit. To test this, fruit were stored under different conditions of relative humidity for one to four days at 20°C.

Figure 3 indicates that storing fruits under relative humidities of 80-98% for up to four days before the percentage dry matter test did not affect the final result significantly. However, storage at 60% relative humidity caused an increase in percentage dry matter from 20.9% to 21.6%. Typical relative humidity in the field is 60%-80%, so holding the fruit under field conditions for several days could result in a higher percentage dry matter. Higher temperatures or more air movement would increase the fruit moisture loss and increase the percentage dry matter result more.

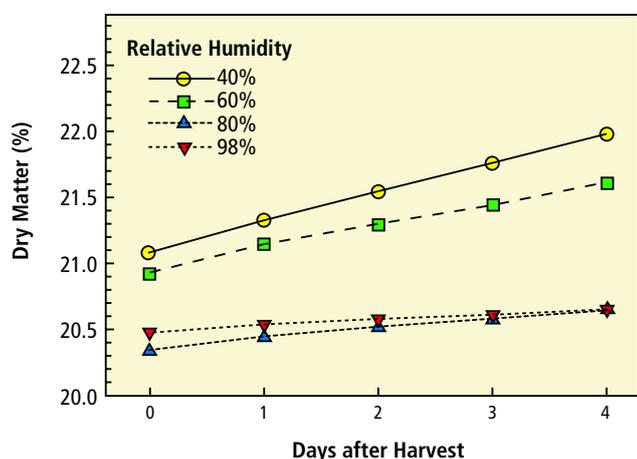


Figure 3. 'Hass' avocado fruit were harvested, stored for up to four days at different relative humidities, and the fruit percentage dry matter determined after one, two, three and four days.

Conclusions

These results show that:

- The procedure for sampling fruit and handling them before testing can affect the accuracy of the maturity test.
- Adequate sampling of fruit from a number of trees across the orchard is very important because of the variation in fruit percentage dry matter between trees and between fruit.
- Mixing smaller and damaged fruit in the sample for maturity testing poses the greatest risk to obtaining a wrong result, because these will have a higher percentage dry matter than the rest of the crop.
- Subjecting fruit to conditions that exacerbate moisture loss before testing can affect the percentage dry matter and combined with inappropriate sampling could lead to very false results.

- Sampling fruit from different aspects of the tree, while not shown to be important in the research described here, could be important in small trees or orchards where canopy crowding does not occur. Therefore, sampling fruit from different aspects of the tree will be more important in smaller trees and less crowded orchards.

Recommendations

- Sample a total of at least 10 fruit per orchard, taking them from each aspect of the tree from a number of trees throughout the orchard. The more fruit used in the test, the more accurate the result will be.
- The fruit used must be representative of the fruit to be harvested. For example, if large fruit are to be selectively harvested, then large fruit should be used in the test.
- Damaged fruit should be excluded.
- Fruit should be submitted for maturity testing as soon as possible after sampling. If this is difficult, store them in a plastic bag in the refrigerator to prevent moisture loss.

The following changes to the existing dry matter procedures would further reduce the risk of immature fruit being marketed:

- Increase the minimum maturity standard to reduce the risk of some fruit falling below the standard.
- Increase the number of fruit sampled. New Zealand requires 20 fruit and the US, 10 fruit.
- Analyse the fruit separately and state that the fruit samples are mature if say 95% of the fruit have a percentage dry matter of greater than 21%.

These last two points become a balance between time and accuracy.

Further comments and suggestions on measuring maturity in avocados are presented in an article by Allan Woolf and co-workers in *The Orchardist* (New Zealand), May 2003.

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News from around the World

Dominican Republic

US Avocado marketer Calavo began importing avocados from the Dominican Republic for the first time at the end of October. The firm will handle 300,000 cartons from the country during the coming year. Eurofruit Magazine - Jan 2004.

Chilean and Mexican Rise

Mexican avocado volumes are expected to be up by 10-20 percent this season. Early reports indicate a good quality crop. Chilean production is also forecast to rise by 10-15 percent and quality is reported to be excellent. Page 55 Americafruit Dec 03/Jan 04.

Mexico

The Spring of 2004 will see the opening of West Pak Avocado's new Mexican packing facility. The operation will be known as Grupo West Pak de Mexico, according to international manager Dave Culpeper. "This will give us control over what's coming into the packhouse with regard to quality. It should give us more visibility and consequently more confidence with the growers there," he explained. The packhouse will be located in Periban, north of Uruapan, in the heart of Michoacan's avocado growing region. Page 80 Asiafruit Magazine Jan/Feb 2004.

USA

Avocado growers of San Diego County, California, the source of nearly half of the nation's avocados, report widespread avocado theft, as the size and price of avocados conspire with geography to make them particularly vulnerable. Thieves come in the night, plucking avocados from trees. The theft of avocados or any other fruit or vegetable is not insurable at the San Diego County Farm Bureau, so the ratio of law enforcement to avocados is slim, with only two deputies patrolling 400 square miles. In Ventura County, 29 suspected thieves were arrested last year and charged with stealing an estimated US\$115,000 worth of avocados. New York Times Jan 26 2004 Late Edition - Final, Section A, Page 1, Column 1.

USA

USDA-APHIS ruling portends change for US avocado sector. If Mexico is granted unfettered access to the US market, California growers will have to adapt quickly to a new market scenario.

An APHIS pest-risk analysis declaring that Mexican Hass avocados pose no threat to the US agriculture sector has rocked the California avocado industry to its roots. The analysis is expected to culminate in a change in legislation that will ultimately allow Mexican fruit unrestricted access to US markets. An industry commentary period ended on September 15, 2003 and the USDA/APHIS is expected to amend existing regulations in early 2004.

If adopted, the new rule would likely signal the end to what has been a decade of record returns for the California avocado grower. Once peddled to pet food processors due to over-production, Hass avocados have been at the vortex of a seemingly unrelenting demand. Restaurant purveyors now expect to pay dearly at wholesale markets for late-season California Hass, its rich taste integral to popular Mexican and

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| <input type="checkbox"/> Environmental management/
sustainability | <input type="checkbox"/> Quality Assurance |
| <input type="checkbox"/> Organic farming systems | <input type="checkbox"/> Technology/innovations |
| <input type="checkbox"/> Water management | <input type="checkbox"/> Marketing |
| <input type="checkbox"/> Field days | <input type="checkbox"/> Supply chain management |
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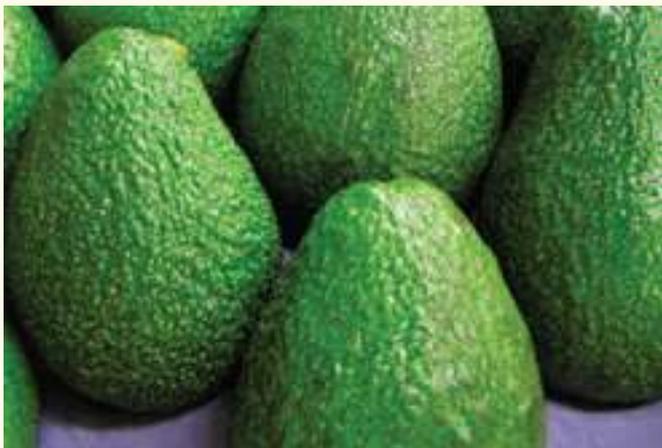
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From around the World

continued

Japanese cuisines. Texans can hardly imagine their "TexMex" recipes unadorned by slices of the creamy green fruit.

The challenges facing the California avocado industry parallel those of other fresh US commodities - overproduction combined with an influx of foreign product.

Fortunately, California avocado grower/shippers have a few things going for them that marketers in many other sectors have not. Several US handlers, including Calavo and Mission Produce, operate Mexican packing operations and have been controlling distribution to the US since the borders were forced open by another APHIS ruling in 1997. If and when import restrictions are lifted, these companies and others are well positioned to incorporate what is bound to be a significant increase in Mexican fruit into their existing distribution systems. Put another way, California's profits, drastically reduced by a smaller market share, should be partially recouped in sales commissions for this new tonnage.

The ramifications of a rule change would be felt well beyond North America. Chilean exporters, accustomed to huge returns by piggybacking on California's dwindling supplies in the autumn, would be forced to compete against Mexican Hass with its cheaper labour and freight advantages. With a population of only 16m and production from new plantings of Hass coming into fruition annually, Chile's avocado production is ideally suited to supply the US market.

New Zealand, another export-reliant country whose fruit has been appearing in US stores in recent years, has already begun to reduce its US export programmes in favour of a rapidly developing Australian market. Expect the Kiwis to continue to keep their avocados close to home if APHIS issues its rule change.

On the import side, Japan could see the resumption of significant California Hass shipments for the first time in years. Introduced from California in the 1980s, Hass avocado consumption in Japan has risen steadily ever since. However, as Californian fruit became more expensive during the 1990s, Japan began to discover the merits of the Mexican avocado. Now, only small quantities of Californian fruit are exported to Japan. All of this could change with a new APHIS ruling, as California would be forced to develop new markets once again.

"If you squeeze the harvest window down and get a larger amount of fruit off the trees in a shorter time, prices could be affected. But this could also open up export opportunities," commented Dave Culpeper of West Pak Avocado.

And Korea might just be a market waiting to happen. Relatively cost-effective ocean freight transportation and reasonable FOBs would finally allow retailers to promote avocados at price points Korean consumers would be willing to consider. "You need that ocean freight factor to begin to build true demand in a developing market such as Korea," said Jim Donovan of Mission Produce.

Change is inevitable, and it appears that California's avocado industry is about to experience this axiom first hand. However, change is often a road to opportunity. By resuming international market development and working closely with Mexico during the transition to a fully open border, California growers should be able to weather any tough times ahead. *Page 80/81 Asiafruit Magazine Jan/Feb 2004.*

National Harvest Labour Information Service

What is the National Harvest Labour Information Service?

The National Harvest Labour Information Service welcomes you to the Harvest Trail. Linking Jobseekers with Harvest Work throughout Australia.

The National Harvest Information Services is responsible for:

- Marketing the National Harvest Trail;
- Developing and publishing an up-to-date National Harvest Guide;
- Providing a national telephone information service;
- Coordinating harvest labour vacancies on the Harvest Trail web site;
- Liaising and establishing networks with growers, grower associations, Harvest Labour Service providers, Job Network members, recruitment agencies and relevant government departments at the local, state and national level; and
- Maintaining a feedback and complaints system.

What is the National Harvest Telephone Information Service (1800 062 332)?

This National Harvest Telephone Information Service operates weekdays from 8.00 am to 8.00 pm EST throughout the year answering queries related to harvest labour and connecting callers to appropriate Harvest Labour Service Providers.

The National Harvest Guide is a publication that provides job seekers with concise and comprehensive information about harvest work opportunities, working conditions, transport and accommodation. It is available free of charge to job seekers across Australia, both in hard copy and on the internet where it is updated on a monthly basis.

What is the Harvest Trail Web Site?

The Harvest Trail Web Site is a significantly expanded and improved site providing comprehensive harvest information and job lists Australia wide. Harvest workers are able to be access job details and provider contact information.

**NATIONAL HARVEST LABOUR
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"Making sure Growers and Jobseekers find each other!"
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✓ Harvest Vacancies ✓ Location Information ✓ Accommodation
✓ Transport ✓ Other Requirements

What is the National Harvest Guide?

Smerdon Enterprises
Mechanical Orchard Pruning

- Vertical hedging to 8.3m
- Flat topping to 5m
- Capable of skirting trees
- Cuts 3m per pass
- Prunes most orchard crops
- Mulching service available

Closed circuit t.v. ensures correct cutting angles are maintained

2295 Old Gympie Road
Glasshouse Mountains Qld 4518
A/H: 07 5493 0268
Fax: 07 5493 0924
Email: kserross@ozemail.com.au

Kerry Smerdon
0438 930 268

Avocado Growers State Organisations

Atherton Tableland Avocado Growers' Association

Merrilyn Land, President 07 4093 2206
Sue Christensen, Secretary 07 4086 6056
Fax: 07 4086 6057

Bundaberg & District Orchardists' Committee
Geoff Chivers, President 07 4153 3007
Judy Skilton, Secretariat 07 4153 3007
Fax: 07 4153 1322

Sunshine Coast Avocado Growers Association
Henry Kwaczynski, President 07 5442 1767
Ursula Starkovsky, Secretary 07 5493 0605
Fax: 07 5493 0608

West Morton Avocado Growers' Group
Rod Dalton, Convener 07 5466 1316
Fax: 07 5466 1497

**Tamborine Mountain
Local Producers' Association**
Bruce Bartle, President 07 5545 1527
Bev Buckley, Secretary 07 5545 2617

**New South Wales
Avocado Growers Association Inc.**
Chris Nelson, President 02 6569 0924
Alison Tolson, Secretary/Treasurer 02 6569 0872
Fax: 02 6569 0885

**South Australia
Avocado Growers' Association**
Colin Fechner, President 08 8541 2819
Greg Liebig, Secretary 08 8541 2174
Fax: 08 8541 2174

**Avocado Growers' Association
of Western Australia**
Alan Blight, President 0417 179 127
Eleanor Press, Secretary 08 9776 1332
Fax: 08 9776 1332

Directory of Government Contacts

Australian Government Departments & Agencies

Department of Agriculture, Fisheries and Forestry
02 6272 3933 www.daff.gov.au

New Industries Development Program
1300 884 588 www.daff.gov.au/agribiz

Agriculture Portal www.agriculture.gov.au

Austrade
13 28 78 www.austrade.gov.au

Australian Bureau of Agriculture & Resource Economics
02 6272 3933 www.abare.gov.au

Australian Bureau of Rural Sciences
02 6272 3933, www.brs.gov.au

Australian Bureau of Statistics
1300 135 070 www.abs.gov.au

Australian Competition and Consumer Commission
02 6243 1111 www.accc.gov.au

Australian Customs Service
1300 363 263 www.customs.gov.au

Australian Pesticides & Veterinary Medicines Authority
02 6272 5852 www.apvma.gov.au

Australian Tax Office
13 28 66 www.ato.gov.au

Australian Quarantine and Inspection Service
02 6272 3933 www.aqis.gov.au

Business Entry Point www.business.gov.au

Department of Employment and Work Place Relations
02 6121 6000 www.dewr.gov.au

Department of Environment and Heritage
02 6274 1111 www.deh.gov.au

Department of Foreign Affairs and Trade
02 6261 1111 www.dfat.gov.au

Department of Industry, Tourism and Resources
1800 024 095 www.industry.gov.au

Department of Transport and Regional Services
02 6274 7111 www.dotars.gov.au

Food Standards Australia New Zealand
02 6271 2222 www.foodstandards.gov.au

Grants Link www.grantslink.gov.au

IP Australia
1300 65 1010 www.ipaustralia.gov.au

The Ministerial Council on Consumer Affairs
www.consumer.gov.au

State Government Departments & Agencies

Australian Capital Territory
Business ACT
1800 244 650, www.business.act.gov.au

New South Wales
NSW Agriculture
02 6391 3100 www.agric.nsw.gov.au

Dept of State and Regional Development
02 9228 3111 www.business.nsw.gov.au

Northern Territory
Dept of Business, Industry and Resource Development
www.nt.gov.au/dbird/dpif

Queensland
Dept of Primary Industries
07 3404 6999 www.dpi.qld.gov.au

Dept of State Development
07 3225 1915 www.sd.qld.gov.au

South Australia
Dept of Primary Industries and Resources www.pir.sa.gov.au

Food for the Future
08 8226 0585 www.food.sa.gov.au

Tasmania
Dept of Primary Industries, Water and Environment
03 6233 6496 www.dpiwe.tas.gov.au

Dept of Economic Development
1800 030 688 www.development.tas.gov.au

Victoria
Business Victoria
13 22 15 www.business.vic.gov.au

Dept of Primary Industries
136 186 www.dpi.vic.gov.au

Food Victoria www.food.vic.gov.au

Western Australia
Department of Agriculture - 08 9368 3333 www.agric.wa.gov.au