



The Australian Newsline

Vol 10 Number 1

Talking Avocados



March 1999



Part of the NSW team visiting Peter Young's Birdwood Nursery at Nambour

- World Produce Expansion
- World Congress in Mexico
- Fruit Spotting Bug Research
- Orchard Mulching

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VICE-PRESIDENT

Frank Moore, Pretty Gully 02 6666 1496

EXECUTIVE OFFICER & SECRETARY/TREASURER

Astrid Kennedy, P.O. Box 19 07 3213 2477
Brisbane Markets 4106 Fax 07 3213 2480

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Secretariat Dianne Fullelove, PO Box 45 07 4153 3007
Bundaberg QLD 4670 Fax 07 4153 1322

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Secretary Larissa Meyer, P.O. Box 675 07 5478 9455
Palmwoods QLD 4555 Fax 07 5478 9869

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Ramco SA 5322 Fax 08 8541 2819

AVOCADO GROWERS' ASSOCIATION OF WESTERN AUSTRALIA

President Wayne Franceschi 08 9776 1332
Secretary Paul Callcott P.O. Box 96 08 9776 1332
Pemberton WA 6260 Fax 08 9776 1332

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Editor and Publisher

Orf Bartrop

Advertising Manager

Astrid Kennedy

AAGF Coordinator

Frank Moore

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Subscription and editorial inquiries should be addressed to Talking Avocados, 28 Nicholls

Street, Devonport Tasmania 7310, Australia. Telephone 03 6423 3230, if no answer try Mobile 0417 501714, Fax 03 6423 3917 or E-mail: orf@southcom.com.au

Advertising inquiries should be addressed to Ms Astrid Kennedy, Executive Officer, Australian Avocado Growers Federation, P.O. Box 19, Brisbane Markets QLD 4106. Telephone 07 3213 2477 Fax 07 3213 2438.

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Calendar of Events 1999

April

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

May

- 14 **NSW Avocado Association in association with NSW Agriculture** - Field Day and a dinner in the evening. The day will start with tea and coffee at 9.00 a.m. at the Ballina Ex-Servicemen's Club, presentations commencing at 9.30 a.m. (see page 13)
- 19 **Bundaberg & District Orchardists Association** - meeting Fruit & Vegetable Growers' Office, Barolin St. Bundaberg, commencing 7.30 p.m.

June

- 1 **Avocado Growers' Association of WA Annual General Meeting** - Conference Room, Market City, commencing 5.30 p.m.
- 2 **Sunshine Coast Avocado Growers Association** - meeting. Details will be given in QFVG News. Contact Larissa Meyer Ph 07 5478 9455
- 16 **Bundaberg & District Orchardists Association** - meeting Fruit & Vegetable Growers' Office, Barolin St. Bundaberg, commencing 7.30 p.m.

July

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

August

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

September

- 1 **Sunshine Coast Avocado Growers Association** - meeting. Details will be given in QFVG News. Contact Larissa Meyer Ph 07 5478 9455

Front Cover:

Recently, a group of NSW avocado growers visited northern NSW and Queensland. The photo shows part of the group at Birdwood Nursery, Nambour.

Vale

The Avocado Industry lost one of its pioneers and highly respected leaders, with the sudden death of Alec Kidd OAM on 6 February 1999.

Mr Kidd started his career as an avocado grower and champion for the avocado industry in 1933 when he planted his first avocado tree. In the early years Alec was a citrus grower and in 1944 helped reform the Tamborine Local Producer Association and was subsequently elected as their delegate to the then Committee of Direction of Fruit Marketing (COD).

As his avocado orchard increased in size, at the expense of the citrus trees, Alec became a foundation member of the Queensland Avocado Advisory Committee and later the Avocado Subcommittee of COD.

Mr Kidd was a grower with vision. He saw the need for a strong national body representing the fledgling avocado industry so that the growers in every State could combine to address common problems rather than deal with them in a fragmented fashion.

Accordingly, in 1974 he guided the emergence of the Australian Avocado Growers' Federation (AAGF), of which he was inaugural chairman. He served as an executive member including 5 years as chairman until the late 1980's.

On farm, Mr Kidd developed an "organic farming" system that is now standard practice for many avocado growers. Knowing that the avocado tree evolved in the rainforests of Central America, he devised a unique system in an attempt to maintain rainforest conditions in his orchard.

Research indicated that Alec's new management practices encouraged the activity of resident antagonistic micro-organisms which were able to suppress the root rot fungus *Phytophthora cinnamomi*, which had on several occasions almost destroyed the Australian avocado industry.

In 1978 Alec played a major role in the formation of the Avocado Nursery Voluntary Accreditation Scheme (ANVAS). Its objectives were, and still are, the production of disease free avocado trees for industry use. This scheme has been very successful in improving orchard establishment and limiting the spread of avocado root rot fungus.

For five years Alec was the AAGF delegate to the Federal horticulture bodies, the Australian Horticultural Growers Council and Australian United Fresh. He was presented with the AAGF Award of Merit in 1986, the highest honour the industry can give and received an Order of Australia Medal in 1989, a justly deserved award in recognition of a lifetime of meritorious service to the avocado industry.

Alec had been involved in industry matters until his retirement from the Varieties Committee in March 1998.

Alec will be remembered as a great contributor to the development of the avocado industry and as one of "Nature's Gentlemen". He will be missed by all for his extensive knowledge and experience and for his goodness.

The avocado industry offers its condolences to his wife Joyce, daughters Rhonda and Jenny and all the family.

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From Your Federation

By Astrid Kennedy, Executive Officer.

Federation Meetings

A Varieties Committee meeting and a Marketing Forum were held in February 1999. The AHC contribution to this TA will expand on the deliberations of the forum.

The Executive extends a warm welcome to Jennifer Overland from Coles and Ron Hansen from WA, to the group. The marketing forum is a skills based group. Jennifer brings a depth of marketing and promotional knowledge from a chain store perspective, Ron has a keen sense for the marketing needs and requirements of the West.

It was with regret that the Forum accepted the resignation of Barry Ross. Barry has contributed to the forum since its inception, provided valuable input and smoothed the way for various training initiatives and joint promotions with the Woolworths chain.

The Varieties Committee reports a marked increase in the number of registered trees being planted and attributes the renewed interest in the scheme to the increasing export activity. The committee plans to produce material highlighting the requirements and the value of planting virus free trees and the various articles will be published through TA as well as being available from the ANVAS nurseries.

If you have a registered block you will be contacted shortly to ascertain whether or not your block still meets the registered scheme requirements and whether or not you want your name placed on a potential export list for distribution to exporters.

The R, D & E Subcommittee will meet on 23 March 1999 and your Federation Board will meet over three days from 24-26 March 1999. Information from these meetings will be published in June TA.

Your Federation has spent a lot of time during the last 2 months responding to various allegations relating to a lack of communication. The AAGF President, R, D & E Chairman and Executive Officer each have an E-mail address, telephone and facsimile number and postal address therefore it was disappointing to find out about the perceived problems in TA. Rod Dalton, Federation President, and George Green, R, D & E Chairman, addressed the executive of the Sunshine Coast association in early February and we believe alleviated their concerns.

Mr Dalton and Mr Green plan to attend a meeting at Tamborine Mountain in April to address any concerns growers may have.

Your Federation has two key communication vehicles, Talking Avocados and

your representative to the Federation Board. TA is the industry journal and the primary means of communication. Over the course of a year it will carry Marketing and Promotional plans, updates and results; Research, Development and Extension information ranging from advice of proposed new work to current project updates, research results and articles of interest; updates on the agri-political scene, Federation activities, Board decisions, the Annual Report, strategic planning results, industry statistics and other items of National interest; and letters to the editor, Australian Round-up and international news.

Federation Directors, your representatives to the decision making process, are updated on a regular basis, often weekly, on all relevant issues. If you have a concern or there is an issue on which you want more information please read TA, talk to your Board representative or contact a member of the Executive. Communication is not a one sided affair.

Horticultural Industry Alliance Steering Committee

The HIASC is an industry initiative. The committee is made up of representatives from industry, AHC, HRDC and government and was formed to evaluate and provide options for more efficient and effective service provision to industry. The process started in March 1998 and a series of options have now been produced for industry consideration. A Green paper setting out the options for a new integrated Marketing and R & D entity to serve Australian horticulture was issued at the end of February.

The Green paper provides information about the legal, business and policy frameworks that would support each option and is designed to help industry debate the merits of all options. The industry consultation period (2 months) concludes on 30 April 1999, after which all submissions will be considered and a final report (white paper) will be developed and delivered to Government outlining industry's preferred option for a new entity. Your Federation is preparing a submission and would welcome grower input.

Mr Denis Byrne, HIASC Chairman, has accepted an invitation to address the Federation Board during their 3-day meeting. This will give your representative an opportunity to consider, discuss and question the options, which in turn will assist her/him in presenting the options to growers.

Additionally, there are plans to hold grower meetings throughout the country.

Growers interested in attending should watch their local and/or regional press for meeting dates. A copy of the Green paper can be downloaded from the Net at <www.hiasc.org.au>. Please provide your comments and input to your local Federation Director for inclusion in the Industry submission by mid-April.

National Peak Industry Body Proposal

The proposal for a National Peak Industry Body should not to be confused with the HIASC proposal outlined above. The HIASC has considered service providers AHC and HRDC, only. The Horticulture 2000 Group is considering a peak body for horticulture, effectively a forum that will act as a peak advisory council for the Federal Government and it will concern itself with national cross commodity issues.

The Horticultural 2000 group believes there is sufficient support within industry to develop the concept and is planning to hold workshops in April in Melbourne to advance the proposal. The aim of the workshop will be to secure industry support to progress the issue and it is hoped that an industry forum working group will be established out of the workshop to develop and fine tune the operational aspects of an Australian Horticultural industry Forum.

Endosulfan

The 1 July 1999 is crunch time. If you have not yet renewed your current accreditation or undertaken an accreditation course you will not be able to purchase endosulfan after 30 June 1999—it will be illegal for a store owner to sell endosulfan without first sighting an accreditation certificate.

A subcommittee of the AustHort Committee has been given the task of coordinating an industry response to the NRA's chemical review program. Endosulfan is their first priority and in conjunction with the NRA, the Cotton industry, National Occupation Health and Safety Commission and other horticulture commodities they are organising worker exposure trials and other data collection requirements. Federation President, Rod Dalton, is a member of the steering committee.



A Pilot Health Claim On Food Labels To Help Reduce Neural Tube Defects In Babies

The Australia New Zealand Food Authority (ANZFA), a government statutory authority, is piloting a health claim communicating the benefits of folate to help reduce the prevalence of neural tube defects such as spina bifida in babies.

The folate/neural health claim pilot is a good opportunity for government, industry, professional and public health organisations and community groups to work together to promote an important public health message that is based on strong scientific evidence.

Scientific experts agree that up to two-thirds of neural tube defects can be prevented if women consume sufficient folate at least one month prior to pregnancy and during the first three months of pregnancy. However, neural tube defects are the result of many factors, and only some of these are understood. Folate can help to prevent many neural tube defects.

The folate health claim pilot is trialing for the first time in Australia and New Zealand the use of a health claim on food packages. Health claims are messages that make a direct link between eating certain foods as part of people's diets and reducing the risk of a specific disease. Having a folate/neural tube defect health claim on food products will assist women of child-bearing age to make healthier food choices.

Folate is a B vitamin and is found naturally in certain foods such as fresh vegetables and fruit, orange juice, legumes, nuts,

liver and yeast. It is present in fortified products such as breads and breakfast cereals and can also be taken in supplement (tablet) form.

It's important for women of child-bearing age to consume 400 micrograms of folate per day for one month prior to pregnancy and for the first three months of pregnancy to help prevent neural tube defects.

Neural tube defects such as spina bifida, anencephaly, and encephalocele are major causes of disability in children and adults. Neural tube defects affect around 400-500 pregnancies in Australia each year. In New Zealand, some 15 babies are born each year with spina bifida. Neural tube defects are one of the most common birth defects in the western world.

The effects of neural tube defects range from mild to severe outcomes, such as paraplegia and other physical and learning disabilities. By preventing neural tube defects, there will be cost savings of many millions of dollars each year to families and governments. But most importantly, families will be spared the emotional and social costs associated with neural tube defects.

The scientific facts on folate are clear. Through the use of a health claim on food labels and community education, an immediate and significant contribution to reducing the risk of neural tube defects such as spina bifida can be made.

Folate is present in avocados and is recognised by the ANZFA, their minimum

for recognition is at least 40 micrograms of folate in each serving.

Last year, the AHC used folate in their promotional material thus giving avocados a head start in the quest to publicise the importance of both folate and avocados.

Brief History of the Avocado Industry RD&E Plan

August 1991 – Bribie Workshop

19 Industry participants (growers and researchers) attended the workshop that produced "The Australian Avocado Industry Research and Development Plan 1991-1996" (TA Vol 3 No 2).

August 1993

Progress Report in TA Vol 4 No 3.

November 1994

List of R&D projects with priorities published in TA Vol 5 No 4.

May 1995

Strategic Plan 1995-98 is published in TA Vol 6 No 2.

July 1995 - Twin Waters Workshop

20 Industry participants (growers, marketers, researchers) produced "The Australian Avocado Industry Research Development and Extension Plan 1996-2000" (TA Vol 6 No 4).

September 1996

List of final reports of R&D projects 1990-95 in TA Vol 7 No 3.

September 1997

List of 1997-98 R&D projects in TA Vol 8 No 3.

March 1998 - Audit

The 1996-2000 Plan was audited to ensure the existing projects were relevant and on track and that the RD&E subcommittee was adhering to the industry's plan. A refocus of the priorities was recommended although the overall priority listing did not change (TA Vol 9 No 2).

Future Update

The Avocado industry will need to update the RD&E plan in the next 18 months to ensure that the research and development program remains focussed and relevant to the needs of the industry.

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TALKING AVOCADOS - HAVE YOUR SAY

Dear Sir,
Why? Why? Why?

When I started producing avocados, we packed them in tissue paper, sent them to the market and they sold the same day. There was rarely any carry over in the markets and never any problem with break down of fruit. Even the stung, chewed and damaged fruit sold as seconds or thirds without break down.

Nowadays, I only send the very best, virtually unblemished fruit and by the time it has reached the consumer there is a high percentage of problems. The stung, chewed and damaged fruit however, is now kept for home consumption, also for neighbours and friends. This fruit is ripened in the kitchen and ripens without any problems. The damaged parts are cut off and the rest is perfect.

Why the variation to the markets?

Some four or five years ago Scott Ledger, from QDPI, did some extensive research into these problems. The effects of bruising through handling, the problems of the forced ripening procedures, transportation, the problems with the retail outlets, etc, etc, were all researched, unfortunately without solving the end problems for the consumer.

I note that this research appears to have been repeated again in both the past two years, again without solution. Are we re-inventing the wheel? If so it has been an expensive exercise for little outcome.

Why the difference between that ripened in the home and that presented to the consumer. The ripening procedure, the cold storage, what? And when are we going to conserve our grower research funds for projects that produce solutions?

As the heading asks, why the breakdown, why the duplicated research, and why no solutions.

*Concerned
A struggling grower*

[Name and address supplied. Ed]

Dear Sir,

I am writing this letter in regards to the Sunshine Coast Report in the December edition of Talking Avocados. The author of that report should have directed his remarks to the Letters Page. The report implies that a major debate is needed on the issues raised, and for a simple member of the organisation, it is always handy to know to whom one is addressing comment.

Just what are these issues? The author seems guilty of his/her own charges by referring to "out of session byplay" without

explaining just what the reference entails. Innuendo is of no use to anyone—if there are matters causing concern, lay them on the table, itemised and clearly defined so those concerned can respond and growers generally can be informed. The avocado world doesn't begin and end on the Sunshine Coast, whatever the hype!

As far as I can recollect, the guidelines for expenditure through the R&D committee were all determined by grower strategy meetings using open priority ranking of issues raised by growers. There was a large measure of agreement on the main issues between meetings at different regional centres. These were adopted for the annual programs.

If progress on solving some of the matters has been slower than expected because of the complexity of the problem, then the particular champions on the Committee are there to keep growers informed. Research on a tree crop is not something that can be turned on and off on an annual basis. That was one of the strengths of the approach taken—that there would both continuity and synergy between the programs selected.

If there are problems with personnel, which may be the case, it is not a matter of throwing the basic program away, but it is very important for the R&D committee to follow closely, to see that the planned program is not compromised. We have the funds available to contract from the best of the scientific pool in Australia.

I suggest the Editor contact involved people so that the debate that seems necessary is under way by the next issue of Talking Avocados.

*Alan Hartley
Lismore NSW*

Dear Sir,

I am most grateful for a pre-publication sight of Alan Hartley's letter and for the opportunity to respond.

I believe that the author of the report to which Alan refers was expressing the growing frustration of many SE Queensland growers.

I can understand that your readers who are not aware of these matters may wonder what he was talking about. These frustrations have been simmering for nearly a year. Just some of them are: the premature departure of Dr Kaiser from Australia, the lack of progress in legalising buffered phosphonate spraying in place of tree injection, a departure from what some growers believe are the established priorities for R&D and the lack of progress in the Fruit Spotting Bug (FSB) Project until 1996.

There is also Puzzlement that the Queensland Horticultural Institute is perceived to be the only centre of excellence in Australia with the capability of executing avocado projects.

These frustrations erupted at the December SCAGA general meeting when a motion was moved and seconded expressing no confidence in AAGF's Research and Development Committee.

The opening speeches indicated to me that the primary problem was a communications failure between AAGF and growers. The mover and seconder were persuaded to withdraw the motion, subject to an attempt being made to re-establish communications and reserving the right to move the motion again at the next meeting if the attempt failed. Subsequently, I discovered that a neighbouring Association had earlier resolved to stop paying the R&D levy. So the frustrations are not limited to the Sunshine Coast.

Before Christmas, I wrote to the President of the AAGF asking if the R&D Committee could meet the SCAGA Executive at its next meeting in order to re-establish communications. His reply is eagerly awaited. In doing this I was very mindful of the comment made at the last AAGF AGM by Mr Gerard McEvelly (the HRDC's Avocado Officer) to the effect that it is essential for the Federation to communicate and consult with growers.

It is easy to dismiss unhappy growers with the comment that they are ignorant whingers but they are serious growers with genuine concerns that need to be addressed. It is unarguable that there is a degree of ignorance amongst all growers.

In my letter to the President of the AAGF I also suggested a directed article in Talking Avocados which summarised the story of avocado research priorities. This might start with the Bribie Island Conference, the establishment of the AAGF strategy and subsequent priority changes. It could usefully conclude with the current list of priorities. Many growers have forgotten what happened in the first half of the decade. There are also many growers who are in ignorance of the R&D program.

I have a clear recollection of the SCAGA grower strategy meeting (these meetings are alluded to by Alan) in about 1990 when we were brainstormed by Alex Banks the then QDPI Avocado Extension Officer. Our top priority was Pests and Diseases, and our public enemy number one was Fruit Spotting Bug. So there was relief when the Conference results were published with Pests at the top of the list.

The frustration is understandable when the AVOMAN project has come to a

glorious conclusion although it was nearly halfway down the priority list. AVOMAN is indeed a fine project reflecting great credit on the team and there is no quarrel with the mechanism by which AVOMAN eventually achieved such high priority.

Notwithstanding the energy and resources now belatedly committed to the FSB Project, we fear that a solution will not be found before we lose Endosulfan. Surely the reprieve gained on Endosulfan is no more than a temporary stay of execution.

Growers' funds partially funded the employment of Clive Kaiser in our industry. Rightly or wrongly, many growers in this area were most favourably impressed by his initial impact—he displayed a new energy and initiative as well as undertaking Venture Research. So there is dismay at his premature departure. It now seems that he had a list of defects as long as my arm. It leads to the question of why growers' funds were committed to his employment in the first place.

One of his promising projects was his work on buffered phosphonate spraying in lieu of tree injection. Anecdote suggests that scores of growers are now following his lead with favourable results but quite illegally. SCAGA fervently hopes that the 'Establishment' will not attempt to bust the racket but will join it by pursuing energetically whatever is needed to legalise the practice.

Alan's letter concludes by referring to the necessity for debate. I wholeheartedly support his conclusion and I would add to it the pressing need for effective and ongoing communication.

Ralph Hoskin
President

Dear Sir,

In reply to Ralph Hoskin's letter, I was a member of the R&D committee but due to other commitments I had to resign. I am not aware of the full story regarding Kaiser so I cannot comment.

I would make the point, however, that it is easy to jump to premature conclusions about research on the basis of initial evidence, only to be shot down when comprehensive screening takes place. The scientific literature and anecdote is full of examples. The FSB project as far as I know (and I see it also from the Macadamia Society side) was stalled for some time until captive insect numbers could be increased as research tools.

The issues identified in the strategy meetings were core problems throughout the industry. They only had that status because there were no easy solutions. The key concept as I said in my first letter, was

that the research programs adopted should be tendered to the most effective organisation and the components should be synergistic. I still think that the basic strategy is sound.

It seems that over the past few years, however, there has either been a breakdown in current communications and/or (most likely, since it happens all the time) people just haven't accessed the literature (Talking Avocados) and done some reading before shooting from the hip. Communication is a two-way street—best appreciation of new results is achieved by building on past knowledge.

I am away a fair bit but I would be more than happy to contribute constructively to discussing the issues.

Alan Hartley
Lismore NSW

Dear Sir,

I am writing in reference to the December 1998 edition of Talking Avocados Vol 9 Number 4, "The Efficiency of Low and High Pressure Trunk Injection of Phosphonate Fungicide".

At last we have something on paper. However, it will be interesting to see the results of future testing that hopefully will be done on trees that are of varied health condition.

I think that it is important that the long term side effects of tree injection should be taken into account, i.e. structural and capillary damage to the trees, recovery times as well as the environmental and economical impact that may occur. These factors should influence readers' choice of injection method.

In regard to the comparisons made in the article, only 20% phosphonic acid solution test can be compared. Chemjet® has never been tested using a 40% solution, only the Sidewinder® was tested at this concentration. You can't make a comparison if you only have the results of one product.

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is the way to inject your trees and we are sure that future testing will prove it. The less spraying required the better.

According to the Pesticide Manual "British Crop Protection Council Tests" less than 10% of spray is effective and 70% ends up on the ground and in the air.

Would some of the problems now being experienced on the Great Barrier Reef have something to do with 70% that goes astray?

Gus Gorissen.
Chemjet Trading Pty Ltd
Bribie Island, Queensland,
www.chemjet.com.au

The letter reproduced below appeared in the Sydney Daily Telegraph on 8 March 1999.

Hold back on Avocados

The avocado season is just starting along the NSW and Queensland coast. Maturity standards and regulations exist but they are not enforced by NSW Agriculture through staff and budget cuts. So, unscrupulous growers dump immature fruit on the market to gain the early season high prices. As a concerned grower I must suggest to your readers that they resist the urge to buy small fruit before the middle of April as this will most certainly be immature and tasteless.

Buy only large, firm fruit with no sign of shrivelling. This is especially important this year because of the wet conditions along the coast.

Ted Knoblock
Coffs Harbour

Dear Sir,

Ted Knoblock's letter (Voice of the People, Monday, 8 March) urging avocado abstinence until mature fruit appears on the market contains a number of gross inaccuracies. [See letter above Ed.]

While avocado lovers may well have to wait til mid-April before they enjoy fruit from New South Wales orchards, the same cannot be said of north Queensland avocados. These have been readily available since mid-February. They are not immature and they are certainly not tasteless, as Mr Knoblock quite wrongly asserts.

Yes, there are maturity standards for the avocado industry and the professional growers and packhouses only harvest or accept fruit that meet those standards.

Far from recommending avocado avoidance till mid-April we urge gourmets everywhere to continue their enjoyment of this truly unique fruit, fresh from the major avocado orchards of north Queensland.

Astrid Kennedy
Executive Officer
Australian Avocado Growers Federation



Industry Manager's say

By Wayne Prowse



Quality - how big is the issue?

Anyone who read through the article "Internal Quality Still a Big Issue" (A. Story in Talking Avocados, December 1998 pp 14-15) would have been dis-

appointed, if not alarmed with the results and in particular the photographs shown. Fortunately in closer reading I realised that photographs were only taken of major defects and on the positive side some 50% of the avocados surveyed were perfect. The other 50% had some form of internal breakdown of which we were only shown the worst examples.

Regardless, the fact remains that there is still a considerable portion of avocados reaching the market place in a condition that is likely to turn consumers off. Going back a few years our qualitative survey indicated that consumers discard 25% of avocados yet come back for more at prices up to \$1.99 or even \$2.49. However beyond this, the risk is considered too high. How far have we come? Possibly not a long way though we have moved ahead.

- Over 50% of avocados sold are ripe and ready to eat— risk of bruising is greater.
- We are selling at least 30% more fruit than 3 years ago at similar prices.
- The negative health concerns are much less than before.
- Retailers now recognise the value of the avocado category to their business and are putting up their own promotion funds in support.
- Avocados have been bought by 36.4% of all households from July to December 1998.

I have discussed the relationship between PROMOTION and PRODUCT before in this column and may be it needs a subtle reminder. All the effectiveness of promotion is "out the window" if the product is not right. If the quality of avocados does not meet consumer expectations they will disappoint and turn away potential follow on sales.

Fortunately, we know that consumers have some level of tolerance for

breakdown in avocados and the number of perfect ones bought must help. However, we cannot be complacent and as the report suggests we must work in partnership with pre and post handling systems to deliver consistently good internal quality to the consumer.

For those who have been so alarmed at the quality survey to suggest that all promotion should be on hold until the quality problem is fixed should think again. We are dealing with a highly perishable product and though there is always room for improvement, the majority of avocados consumed do meet consumer expectations.

In addition our promotion efforts are helping the consumers to be more selective in their choice, take more care in handling and better understand when an avocado is just ripe to enjoy. Let all sectors of this industry work together to simultaneously address issues to improve quality and promote the very strong luxurious image that consumers have of the perfect avocado.

That being said our merchandising program will focus on "Bruising" this month. Merchandisers visiting 600 retail stores will survey a sample of 6 pieces for external quality and will cut at least one avocado that shows a bruise before the produce manager. This will be to demonstrate the internal effect of the bruise as part of the education program to encourage produce managers and their staff to treat avocados carefully.

Woolworths promote avocados - cooperatively

In the December issue of TA I summarised the 136 in store demonstrations that we, through our agencies, directly managed. This figure did not take into account a large Woolworths managed promotion program that we contributed to.

During October and November some 420 in store demonstrations were conducted throughout Australia in Woolworths stores. The program was jointly funded by Avocado levies with Woolworths coordinating with "Fresh Cuts" and Linsey Foods (salad dressings) to promote avocados in a simple serving suggestion with fresh cut salad vegetables and a dressing. This promotion took the

place of our normal allocated demonstrations in Woolworths.

The promotion was successful in lifting sales of avocados in Woolworths along with complementary products. It was an example of how effective use of resources can reach a greater number of consumers and we look forward to further successful initiatives.

In another activity we teamed with TIP TOP to promote their "White Stuff" bread with avocado used as a spread. This reached some 85 stores in NSW at only \$10 per store cost to us.

Public Relations is working

A value of \$245,000 in media publicity was generated from our program in July - December. This is up from \$205,000 for the same period last year. Again a focussed campaign with a series of interest stories has helped raise the profile of the avocado industry in the media and the team at "The Corporate Advantage" agency has done a great job.

The "Greenskin" season was launched with a special release introducing Shepard avocados and other greenskin varieties. We made a big issue of the fact that greenskins do not turn black. New consumers introduced to avocados through HASS are confused at this time of year when their avocados do not turn dark when ripe.

In our next release we are focussing on the nutrition story of avocados and are fortunate to have the support of one of Australia's leading nutrition writers, Catherine Saxelby. Catherine has been a supporter of avocados in the media for many years and it will be invaluable to have her involvement in preparing the release and acting as a spokesperson for us. In addition Catherine's involvement will help unlock many other nutrition opportunities, not the least being the FOLATE health benefits program that avocados are a part.

Marketing Forum

The Marketing Forum met in Brisbane 23 February to review programs and recommend the directions for the next 12 months. Overall the forum was pleased with the outcomes of the current programs noting that the various programs are working together cohesively. No significant changes are signalled except that



opportunities for cooperative promotion need to be pursued further.

The market research from Flemington Markets and the new "Homescan" national consumer's data is helping track the season and promotional effectiveness. The data clearly shows the importance of the September/October period for peak promotional effort.

Quality and Packaging issues were also discussed. The forum endorsed further research to improve packaging to suit all needs in the current weight range. However, the forum resisted moves calling for a 4 kg tray unless international research proved beyond doubt that quality/sales improvement would more than justify the loss in handling efficiency and extra cost.

The forum recorded the resignation of Barry Ross. Barry's new national role in Woolworths has made it difficult for him to continue his commitment to the Avocado Marketing Forum. We have appreciated his professional input that has helped nurture the forum into a credible advisory body on marketing issues to the Avocado industry.

Llanos Hass - What Are They Like?

As mentioned in the last issue of Talking Avocados, Anthony Llanos has developed a new variety of Hass avocado.

A survey of sixteen people was carried out to determine the public's response to this new variety.

The results were:

Peeling

Easy - with only 2 saying some difficulty, 1 said "Magic".

Seed

Easy to remove - 2 said difficult.

Flesh Quality

Creamy - 10.

Very creamy - 6.

Comments:

- Firm texture, lots of flavour.
- Texture was firmer than heavy cream
- Excellent texture creamy and tasty.
- Very full flavour
- Ideal for serving in pieces.
- Very firm, easy to handle, fine consistency.
- Note green colour, easy to spread.
- Not oily, good texture.

Taste

Excellent - 11.

Very good - 5

Comments:

- Very beautiful.
- Clean fresh taste.
- Slightly nutty/cream.
- The most flavoursome avocado I've ever tasted.
- Flavour is mild.
- Very enjoyable.
- Very good flavour and texture, easy to eat as they don't seem as heavy (fatty) as most.
- Very creamy and nice colour.
- Very good.
- Very nice avocado.
- Good flavour, sort of nutty.

Compared with other avocados

- I would say the nicest of the lot.
- Far better than any other avocado, firm but a lot of taste.
- Equal to or superior to other varieties.
- Texture and freshness best points.
- I was very impressed with all aspects of this fruit. It certainly will give all Hass a run for its money.
- Superior taste, texture and quality.
- Very good but should have compared it to a Hass.
- Generally a pleasant fruit, perhaps a little drier than some.
- I found the skin thinner than other varieties enclosing more flesh. Perfect

piece of fruit, equal to other varieties I have tried and enjoyed.

- Superior, marred only by being slightly watery but this may have been due to samples being a bit over ripe.
- Yummy. An excellent flavour, sort of nutty and very creamy.

Alec McCarthy, a horticulturist with the Bunbury Regional Office of Agriculture Western Australia, said of the Llanos Hass; "After allowing the fruit to ripen naturally, I took a couple into work and 'test marketed' them on some of my colleagues. Some of their comments were - very good, easy to peel, tasty, nutty flavour, not dry, a subtle not strong flavour, even ripeness throughout and nice.

"Naturally (well greedily) I kept a couple for my own eating. My comments on the variety are that it is easy to select the stage of ripeness you prefer due to its very flexible skin (it seems to lack the corky grit layer that Hass has), it is very easy to peel (once again due to the flexible nature of the skin), the flesh texture was very smooth with no stringiness and the flavour was mild which I, only an occasional avocado eater, found very pleasant.

"Based on my observations of some of the features of the fruit and the apparent precocious nature of the tree (as seen on the Llanos property) I would suggest the selection is well worth continuing evaluation and test marketing. I believe the flexible nature of the skin will appeal to consumers who have had trouble determining the ripeness of Hass. The mild flavour, while perhaps to seasoned avocado lovers is a bit mild, I believe will be enjoyed by younger consumers and new or occasional avocado consumers. These attributes I feel could be used to develop a healthy market slot for Llanos Hass."

Llanos Hass are currently being trialed in Western Australia, Queensland, New South Wales and the United States. New Zealand growers have also shown an interest in this variety of Hass.

Homescan For Avocados

The avocado industry will be the first AHC participating industry to benefit from the AC Nielsen 'Homescan' survey.

'Homescan' data is collected from a panel of 5000 consumers selected to represent the demographics of Australia. The volume and prices of fresh produce purchased by the consumer panel is transmitted by modem to the AC Nielsen computer for processing.

This forms the basis for a report showing how many people purchased avocados in the four week period, the quantity they purchased, prices paid and other useful market information.

The data will be valuable for measuring the success of promotional programs and providing a snapshot of the market generally in all States.

Progress Drives World Produce Expansion

By Bob Galinsky, courtesy of the Asia Regional Agribusiness Project/Fintrac Inc. through the Market Asia web site at: www.marketasia.org

Because of the lessening of trade barriers and advances in production and transportation technology, more fresh produce is being traded now than at any other time in history. Several trends have been driving this expansion, including global and regional trade agreements and the expansion of the supermarket trade worldwide. At the same time, fresh-produce suppliers are being forced to deal with greater consumer concern about food safety, which has been rising along with imports. Finally, environmental, or green, issues will continue to affect consumer decisions in developed countries. Innovative, progressive suppliers will be rewarded in the market.

Knocking Down Barriers

One major trend affecting the fresh-produce trade has been the relaxing or dismantling of trade barriers worldwide. Global trade agreements such as the General Agreement on Tariffs and Trade (GATT) and regional agreements by groups such as ASEAN have reduced tariffs and made other, non-tariff barriers subject to scientific justification. Because of these trade agreements, one can now find products such as US apples and lettuce and Chilean stone fruit and grapes for sale in markets all over the world. This writer has spent a lot of time in Indonesia, for example, and has been amazed at the penetration of Washington State apples into the smallest village. The opening of new markets creates exciting new business opportunities for suppliers. Just recently, Mexico opened its doors to US cherries. Additionally, China has allowed access to US apples and grapes, and Japan has decided to allow imports of US tomatoes. The opening of these markets will mean millions of dollars to US growers.

Of course, getting countries to abide by trade agreements like GATT is not always easy. Free trade in fresh produce is often seen as a direct assault on a country's farmers, and many countries will go to great lengths to keep out competitors. Patience and perseverance are required, and governments must work closely with private growers and exporters not only to lobby for access to foreign markets but also to provide the scientific evidence often required as a condition of entry.

Supermarket Bulge

Another trend affecting the produce trade worldwide is the expansion and consolidation of supermarkets. Some US supermarkets, such as Wal-Mart, have expanded into Latin America and Asia. Meanwhile, European chains have been so busy buying one another that some analysts estimate that in five years 10 supermarket companies will account for 60% of the European market. Many European supermarkets are also expanding abroad. For example, Carrefour, a French company, is now the largest supermarket chain in Brazil. Likewise, Makro, a Dutch supermarket company, is busy growing in south-east Asia, especially in Indonesia and Thailand.

German supermarkets such as Rewe and Swiss-owned Metro have ambitious plans to build hundreds of stores in the next few years in China, Poland, the Czech Republic, Hungary, and other countries in Eastern Europe.

This expansion presents great opportunities as well as challenges to suppliers. The advantages stem from the fact that supermarkets are steady buyers and payers, usually operating on a contractual basis rather than on consignment as many wholesalers do. Because more and more people worldwide are doing their food shopping at supermarkets, selling to these large stores is a great way to increase retail sales of tropical fruit.

Supermarkets are also well positioned to increase sales of tropical items through point-of-sale materials, in-store sampling, price promotions, and fresh-cut items. Although selling directly to supermarkets has its advantages, it also poses significant challenges.

Supermarkets are extremely demanding when it comes to suppliers and often expect them to change their production schedules to meet store supply schedules, rather than the other way around. Supermarkets typically are very strict with quality specifications and often do not provide a sales outlet for second- or third-grade product. On the up side, supermarkets will give many suppliers the opportunity to grow and expand along with them, a benefit to serious growers. Competition among suppliers is fierce, however, and supermarkets will choose their suppliers based not only on product

quality, but also on variety, convenience, consistency, and marketing assistance. Consequently, only the best suppliers should try selling to supermarkets directly; the fresh-produce trade is unforgiving, and it is not a good idea to promise anything one is not ready to deliver.

Is It Safe?

Supermarkets are not the only ones that are unforgiving when it comes to unsuitable product: consumers who get sick from contaminated produce also are unlikely to be repeat buyers. In all major developed markets, food safety has always been a great concern among consumers, but it has become especially publicised of late. Because of recent media attention on the issue in the United States, for example, recent polls have shown that food safety ranks at the top of the consumer "fear index", ahead of plane crashes. For the past two years, outbreaks of food poisoning in the United States linked to a parasite called cyclospora have been traced to Guatemalan raspberries. As a result, Guatemalan suppliers have lost millions of dollars in sales and spent millions more to upgrade their packing facilities to maintain access to the US market and regain consumer confidence. Food-safety concerns are not confined to the United States. A 1996 e. coli outbreak that sickened 6,000 people in Japan and was blamed on domestic radishes caused all fresh-produce sales to plummet. Hong Kong's consumers are reportedly wary of vegetables from China because of high pesticide residue levels. In Europe, many supermarkets are extremely vigilant about hygiene and require their foreign suppliers to adhere to the highest sanitary standards. Vegetable suppliers in Africa must undergo periodic audits to assure nervous European buyers that their produce is safe and wholesome.

What can one do about bad publicity related to food safety, which can cost millions of dollars in lost sales? The best response is to invest in proper handling procedures that meet or even exceed food-safety standards like HACCP. When accused of causing food-borne illnesses, growers should be able to show that their safety procedures are impeccable and that the contaminant in question probably occurred somewhere

else in the supply chain. It is also a good idea for growers' associations and governments to set up strict standards for all exporters, so that exporters with poor sanitary practices are prevented from causing health problems and ruining their country's reputation as an exporter.

Sensitive Sellers

Another important trend in the produce business is the continuing success of food producers who demonstrate concern for consumer health, labour issues, and the environment. The most dramatic example of this trend has been the boom in organic and natural foods. The organic-food market is growing rapidly in all of the major developed markets, especially in the United States, where supermarket chains specialising in organic foods provide effective avenues for retail distribution. Annual growth in the country's organic-food industry has approximated 20 per cent for the past several years and so far shows no sign of slowing. Japan, with its extremely

health-conscious population, is another strong market for organic-food products.

Low-pesticide vegetables are selling extremely well in Tokyo's wholesale markets, for example, and major trading companies are increasing their imports of organic frozen vegetables. Several US-based organic certifying agencies have opened offices in Japan to certify producers of organic foods. Health foods have a long history and a wide market in Japan, and the professionalisation and accreditation of organic-food producers should only serve to bolster this industry.

In Europe, organic foods are also growing in popularity, but ethical issues lately have overshadowed health concerns. Supermarkets in the United Kingdom, for example, have come under criticism for sourcing cheap food from developing-country producers that have poor safety and labour records. European concern for worker well being accounts for the success of "fair trade" bananas in the region's northern markets. These bananas, although higher priced than standard bananas, are

certified by a non-profit foundation as coming from low-pesticide, worker-friendly producers. Fair trade bananas will be introduced in Germany, Europe's largest market, this summer.

It is clear that the future presents many challenges as well as opportunities for produce suppliers worldwide. Freer trade will bring more choices but also fiercer competition.

The expansion of supermarkets offers a great opportunity to increase distribution and consumer awareness of a variety of products. Still, it challenges suppliers to increase their level of professionalism and reliability or be left behind. Similarly, consumer concerns about food safety, environmental stewardship, and labour issues can be viewed as either potential threats or legitimate demands that should be met in the marketplace. The most successful suppliers of tomorrow will be those who recognise, and respond to, the opportunities offered by these trends, and who rise to the challenge of meeting them head-on.



Gray Plantations

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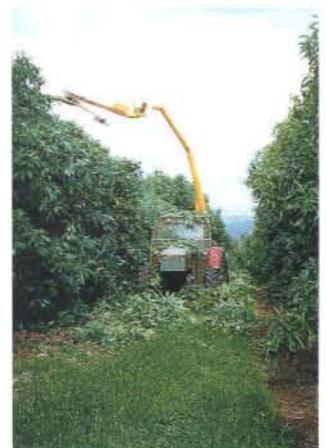
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Australian Round-up



West Moreton

The area lost one of its more dynamic and progressive avocado growers with the recent death of Gary Lubach, aged 48. His friends will always remember Gary's inspirational fight with the demon cancer.

Gary's initial involvement with avocados was as a DPI extension officer based in Gatton. In later years he established orchards at Hampton with his brother Brian. Recently Gary and his wife, Robyn, purchased an orchard near Gatton that has since been planted with avocados.

The avocado fraternity extends to Robyn, their three daughters and Brian our condolences and offers them our support for the future. At the time of his death Gary was a member of the Board of Natures Fruit Company.

The summer has been kind to most orchards although the summer fruit drop was reported as above normal by a number of growers. Overall the crop from this area will be below average in the coming season.

Sunshine Coast

Grower Association Annual General Meetings are normally unremarkable events. SCAGA's 1999 AGM will see major changes in the management of the Association. Our Constitution has a sunset clause that sets a maximum service period of 3 years for the Association's officers. This means that, within a month, SCAGA will have a new President, Vice-President, Secretary and Treasurer. The Industry will see a major change in the style of the conduct of avocado affairs in SE Queensland.

There is some justification for criticism that affairs have been mismanaged when there has to be a complete replacement of all officers at the same time. But there is a danger that any Association or Federation can be stuck in a rut when office bearers hang around for what seems forever. That is why sunset clauses are written into constitutions. The prospect of change should be seen as an exciting development and not as something to be feared. The only thing to be feared is the apathy that seems to discourage growers from taking their turn in serving their Association. We all have a duty to give so that we have an

organisation that has something to offer to grower members. Without such giving, grower associations will wither.

That there is a need for grower associations is undeniable and has been demonstrated by SCAGA's recent experience. We have long known that there are nearly 300 potential members in our area, but only about 35% have joined the Association. We now have a steady trickle of new applicants, and membership is moving towards 50% of its potential. The thirst for more knowledge of our crop is always a powerful incentive to join a grower association. We believe our efforts to organise events that satisfy that thirst are bearing fruit and are responsible for some of our increased membership. But there is another factor of serious concern that is driving growers into association. That is the prospect of increasing regulation when we are supposed to be enjoying deregulation.

The catalyst for associating is fear—fear of an unknown future. What is clear is that market prices are more or less static. But costs are increasing and too often those costs are government imposed or encouraged. There is the ICA and the prospect of Chemical Residue Testing, there is the HACCP and the thought that a simple fruit packing shed might be regulated as a food preparation area. The fear is that nobody is shouting for the small guy.

What we lack is an Industry Peak Body for the whole of horticulture that is capable of putting Industry's view to the Federal Government. Sure, there is a proposal for a shadow of the real thing. It would cost nothing and the inference is clear—it would do nothing useful. It has been proposed by the Federal Parliamentary Secretary to remove a departmental difficulty. She seeks to create an effective channel for the efficient imposition of the government's will on growers. So Industry should not support the creature that she proposes. We should be proposing a Horticultural Peak Industry Body with the capacity for leaving Governments in no doubt of the views of growers. It will cost money—one cannot influence governments with a part time executive officer supported by a part time clerk. At least those costs would be under grower control, and we might see some value for our money.

This is a local view in SE Queensland. But we believe it has massive implications for the whole Fruit and Vegetable Industry.



A very wet summer (for most of us) is almost over and we approach the start of picking with a good crop hanging and the

promise of an excellent season.

Individual growers who market their own crop should, however, be aware of the "winds of change" that are sweeping the industry. Major retail chains control about 75% of all consumer sales and require quality certification on their supplies. Increasingly, market power will be used by the chains to achieve their commercial objectives.

Therefore growers should ask themselves if they are best served by continuing to market their own fruit in the face of change or should they consider joining one of the specialist avocado marketing groups and benefit from collective market strength of such a group.

It is timely once again to remind you all of the need for "Chemical Handling Accreditation". Any growers who have not undergone this training should consult their local Department of Agriculture or local Branch Secretary for assistance.

All NSW Association members and growers should have recently received advice calling for payment of 1999 membership dues. Your Committee has been able to reduce these fees by one third to \$80. Your association needs your support—**DON'T DELAY, SEND YOUR SUBSCRIPTION NOW.**

In the same mailout you were advised of a major Field Day and Dinner to be held on 14 May. Members should be aware that major events such as this are cost subsidised from Association funds. Full details of this event appear on the next page of this magazine.

The 1999 AGM will be held at the House With No Steps, Alstonville, at 10.00 a.m. on 31 March. Morning tea will be supplied and when the AGM is concluded, Wayne Prowse (AHC) and John Dirou (NSW Agriculture) will address the subjects of the current position of avocado marketing and quality assurance.

Our Trip North

March 2-5 saw a memorable bus tour of northern avocado orchards, a nursery, research and packhouse facilities. The tour was organised by the Coffs Harbour Branch. Congratulations go to both

Andrew Wright and Chris Nelson for their contribution. The real star, however, was John Dirou. John put the itinerary together, made all the arrangements and acted as tour guide and marshal—congratulations John. Everyone had a great time as we visited major growers from Duranbah to the Childers region and then back to Toowoomba. The common thread to all visits, albeit with some variation, was the need for:

- a. canopy management
 - b. precise control of nutrition
 - c. optimum water application
- to reach the "Holy Grail" of 20 tonnes/hectare production.

It would be unfair to highlight any particular grower or orchard as each was, in its own way, a memorable experience. While each demonstrated (very clearly) the benefits that followed from commitment to the cultural ideals listed above, they each showed us variations in approach in the achievement of their goals.

The orchards visited were:

1. Tropical Fruit World - Bob Brinsmead - Duranbah.
2. Graham Anderson - Duranbah
3. Ron Simpson - Childers.
4. Lachlan Donovan - Childers.
5. Graham Thomas - Hampton.
6. Mike Geraghty - Hampton.

Our thanks go to these growers for their time, hospitality and the freedom with which they shared their views on the industry.

A visit to Birdwood Nursery at Nambour saw us catch up with Peter Young as he gave the group a very interesting tour of his facility. As we walked around, Peter gave advice on the nurturing of young trees, canopy management and fielded a wide range of questions in a very entertaining and informative manner.

While at Nambour, we visited the headquarters of the Sunshine Coast Fruit Marketing Co-op, a major avocado packer and marketer that packed and sold almost 400,000 trays in 1998 on behalf of their members. Paul Schramm, manager of the packhouse, gave us a very interesting tour of the facility.

A very informative visit to the Maroochy Research Station saw Dr Tony Whiley and Dr Peter Hoffman update us on industry research projects currently in progress.

Some 26 people went on the tour including one grower from Mildura and growers from as far south as Comboyne near Taree and Peats Ridge near Gosford.

Avocado Field Day And Dinner

The NSW Avocado Association in association with NSW Agriculture have organised a Field Day for Friday 14 May, followed by a dinner in the evening. The day will start with tea and coffee at 9.00 a.m. at the Ballina Ex-Servicemen's Club with presentations commencing at 9.30 a.m.

Morning Session

The theme of the morning session is "Nutrition", with a variety of speakers expanding on various aspects of this important topic. They include NSW Agriculture representatives, David Hewitt and John Dirou, and private company representatives, Peter Williams of Agrobrest and Graeme Sait of Nutritech Solutions.

To complement these very capable presenters we have two international guest speakers, Jan Toerien (Avodata), formerly the manager of Wesfalia in South Africa, and Dr Jonathan Cutting, who is contracted to the New Zealand avocado industry to serve as their Technical Manager. He has a special interest in avocado nutrition.

Afternoon Session

In the afternoon there will be a tour by bus to two properties in the Alstonville area.

Topics

Topics covered in both the morning and afternoon sessions include:

- Crop nutrition replacement
- Importance of calcium
- Promoting sustainable agriculture
- Canopy management
- Pyramid pruning
- Spreading round bale mulch by mulslasher
- The NZ experience with nutrition.

Cost of the day session, including morning tea, lunch and bus tour:

\$25 for NSW Avocado Association members and Sunshine Coast Avocado Growers Association members (proof of membership please).

\$35 for non-members.

Avocado Dinner

In the evening all are welcome to attend a Dinner at the Ballina Ex-Servicemen's Club. Special guest speaker will be Dr Jonathan Cutting who will speak on "Marketing - the NZ Approach". Besides being contracted to the avocado industry,

Jonathan is a NZ based horticultural consultant specialising in subtropical fruits. He also is a consultant to a major NZ exporter.

Cost for the dinner:

\$25 for NSW Avocado Association members and Sunshine Coast Avocado Growers Association members (proof of membership please).

\$35 for non-members.

Please contact the organiser listed below by letter or telephone before Monday 7 May indicating names and your intention to attend the field Day and/or Dinner.

Field Day Organiser

579 Dunoon Road

Via Lismore NSW 2480

Ph: or Fax: (02) 6687 7716

or (02) 6684 2676

WANTED

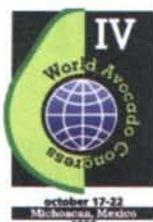
Avocado Growers

- Do you want avocado associations to die?
- Do you want to go unrepresented in matters of the future of your industry?
- Do you want avocado research to end?

Well join an association near you and do something about it.

On the opposite page the Sunshine Coast Avocado Growers Association indicates that only 35% of avocado growers in the area are members of that association. If those 35% take the same attitude as the 65% non members, then the association would die. If all avocado growers adopt the same attitude the AAGF will die along with the hopes and aspiration of the avocado industry.

**JOIN NOW
AND SUPPORT
THE AVOCADO
INDUSTRY**



The IV World Avocado Congress

The IV World Avocado Congress will take place in 1999 in Mexico. People in the avocado industry will gather in Mexico to share their experiences and exchange technical and marketing information as well as meeting new friends. The history and ancient cultures of Mexico will be available to visitors.

Site

The congress will be held at Universidad Don Vasco and at the Facultad de Agrobiologia of the Universidad Michoacana de San Nicolas de Hidalgo, in the city of Uruapan, Michoacan, Mexico on 17-22 October 1999.

Program

The Congress program has been designed to cover the most diverse interests related to the avocado industry. In the area of **Productivity and Quality**, interesting sessions will be included on genetic resources and breeding, physiology of flowering and fruiting, nutrition, irrigation, fertirrigation, pest and postharvest management. In the area of **Marketing and Processing**, a discussion will be held as to how to promote a higher consumption of the avocado fruit and avocado derivatives, for the benefit of producers, marketers, processors, and consumers. The positive effect of the avocado on human health will be fundamental for this promotion in the international markets.

History and Uses of the avocado in Mexico, its place of origin, and in other countries to where it was transferred, adapted and adopted, will be of great interest for the general edification of the participants in this Congress.

Other Activities

The week before the congress (13-16 October) interesting workshops and courses on fertirrigation, diagnosis and management of pests, integrated orchard management, analysis of production costs and organic avocado production will be offered.

During the week of the congress (17-22 October) and in the week after (23 October) participants will have the opportunity to visit the archaeological zones and becoming acquainted with the cultural richness of the music, history art, and natural beauties of Mexico.

Climate

The average temperature in Uruapan, in October, is 20°C, with a low of 12°C and maximum of 29°C. The days are usually sunny, with a slight possibility of rain.

Registration

You can register by depositing the Registration Fee in the BANCO NACIONAL DE MEXICO S.A. Bank, Account number: 153-9170232. Fax a copy of the deposit slip to +52(452) 4-4172 with your name, address and occupation. Congress organisers will send you confirmation of registration and your personal Congress participant code.

Registration Fees

Congress members

Before 1 September - US\$400
After 1 September - US\$450

Companions

Before 1 September - US\$200
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The registration fee for congress members includes: welcoming cocktail party, program and proceedings, participation in all of the sessions, simultaneous translation in Spanish and English during the sessions, field trip on October 20th, banquet, lunches from Monday through Friday (18-22 October), nightly cultural events, and transport Hotel-Congress-Hotel.

The registration fee for companions includes: welcoming cocktail party, cultural trips from Monday through Thursday (18-21 October), simultaneous translation in Spanish and English during the field trips, nightly cultural events and banquet.

Anybody interested in obtaining more information and who has access to the Internet, full details may be found at: www.aproam.com/congreso/indexen.htm



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Farmer's Guide To The Internet

The Internet is becoming a very useful tool for producers. Gone are the days when growers complained of lack of information—or perhaps the correct phrase should be “those days should be in the past”.

As a communications media, the Internet provides a great opportunity to find information on just about every subject one can think of. As you will read on page 19, even AVOMAN will soon be taking its place on the Web.

To assist rural people to navigate their way around this electronic phenomenon, a guide has been produced that should enable anyone with the right equipment to access a never ending wealth of information.

The Australian Farmer's Guide to the Internet will help farmers and other Internet users find everything from boots to birds, feedlot steers to farm machinery, weather forecasts to weed identification kits, quickly and easily.

The Guide, commissioned by the Rural Industries Research and Development Corporation (RIRDC), and produced in

conjunction with Farmwide Pty Ltd, aims to give farmers confidence in connecting to and using Internet services, and provides them with a starting point for finding information which is relevant to their farm business.

The Guide contains detailed information for farmers and rural users on how to connect to the Internet and use services such as e-mail, newsgroups and search engines. Tips to maximise the speed and efficiency of the Internet, which is especially important for rural and remote users with poor connections or high access charges, are also included.

The Guide features a directory of over 250 Australian and overseas agriculture-related sites, each with a description and site rating. The directory covers areas as diverse as trading on the web, farm organisations, government services, financial services, research and development and some overseas sites.

The Internet is dramatically changing the way we, as individuals, communities, and government interact. Unfortunately, it is

not all plain sailing, which is why The Australian Farmer's Guide to the Internet is needed. With this Guide, communities around Australia can now, more than ever before, be a part of the global community, with expanded market opportunities, access to leading edge information and a wider range of industry contacts.

However, as discovered through RIRDC's research and the Farmwide on-line services pilot project, there is a wide and varied range of material available on the Internet, which can be rather daunting for beginners.

Searching for specific information can be time consuming and costly.

It is against this background that RIRDC and Farmwide joined forces to produce the Australian Farmer's Guide to the Internet, to cater specifically for the needs of the Australian rural sector.

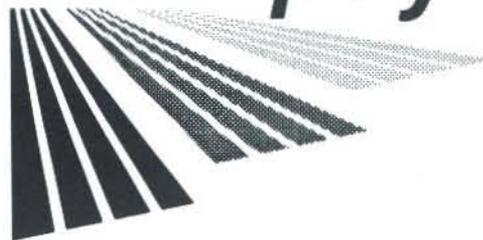
Further information on the Guide is available from Farmwide, Ph 02 6273 6395. Copies of the book are available from RIRDC for \$25, Ph 02 6272 4819.

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- ✓ 60% of produce sold to the Melbourne Markets goes through Farmpay Wholesalers

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SQF 2000

In the December 1998 edition of this magazine (page 16), an article appeared on the SQF 2000 Quality Management System. A package was offered containing printed and floppy disc copies of "Production and Packhouse Generic Quality Management Systems", together with covers and tabbed internal dividers.

If you are interested in obtaining a copy or copies, please use the form below to place your order.

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Export Drive To Feed On Internet

By Geoff Hiscock, Asia business editor, *The Australian*, 1 December 1998

Overseas food buyers looking for anything from Queensland avocados to Tasmanian salmon or Victorian specialty cheeses have a new aid with the launch of FoodConnect Australia, an online service listing products from more than 400 local food companies. The service is designed to increase Australian agribusiness exports via the Internet.

Australia's total food exports in 1997-98 were more than \$18 billion (of which about 60% went to Asia) but the potential is greater. Japan, for example, last year imported \$70 billion of food, of which Australia supplied only \$5 billion. Launched late last year, FoodConnect allows overseas buyers to source and order a wider range of products. Sellers can verify orders and arrange export documentation via the Internet.

The service was developed by the food industry, Supermarket to Asia Council and Telstra. Eventually, the system will have an online shipment capability.

The pilot program will continue as a free trial until the middle of the year, when the organisers will start testing a charging model likely to be based on transaction costs rather than a flat fee.

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AVOINFO

Your Instant Avocado Library

The AVOINFO software was released last year at the same time as AVOMAN. For those who don't know much about AVOINFO this short article will help put you in the picture.

85 years of information

A total of 4208 references are included in AVOINFO. The earliest was published in 1911 and the latest in 1998. Material has been included from over 50 journals, conference proceedings, bulletins, yearbooks and so on. As well as papers published in English, AVOINFO contains references originally published in Afrikaans, Chinese, Dutch, French, German, Greek, Hebrew, Italian, Japanese, Mexican, Portuguese, Spanish and even Russian. These references have been translated into English where abstracts are available.

A significant number of references are included from the South African Avocado Growers' Association Yearbook (556 references), the California Avocado Society Yearbook (468), World Avocado Congress proceedings (272), Israel's Alon Hanotea (100) and Talking Avocados (70).

Abstracts (summaries) or full articles are provided where copyright release has been granted, and sometimes figures are also available. A total of 2363 abstracts or full articles are provided which represents over half of all references included. Each reference contains the details necessary (authors, address, source and year of publication) to request copies of original articles (eg through your local library).

Information is easy to find

AVOINFO is equipped with a powerful search facility. You can search for information using up to five different criteria:

- keyword(s)
- title(s)
- author(s)
- source(s)
- abstract

Keywords

When you are searching for information on a certain topic the keyword system is particularly useful. A standard list of 200 keywords was developed and one or more of them has been allocated to each of the 4208 references. To make it easier to use keywords they have been logically grouped under 19 categories:

Figure 1. Using the key word facility to find information, this example shows some of the keywords included under the "orchard management" category.

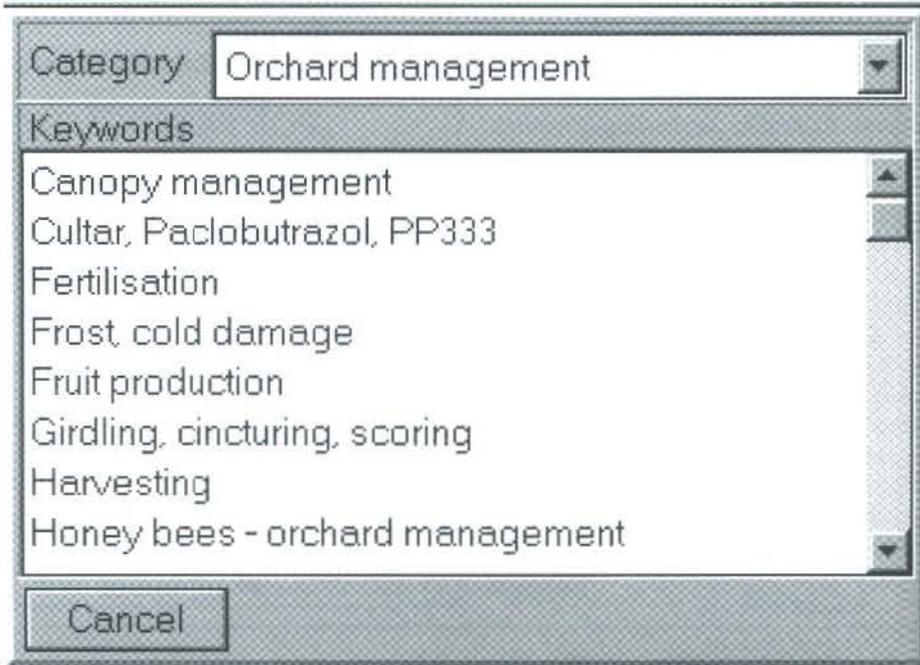
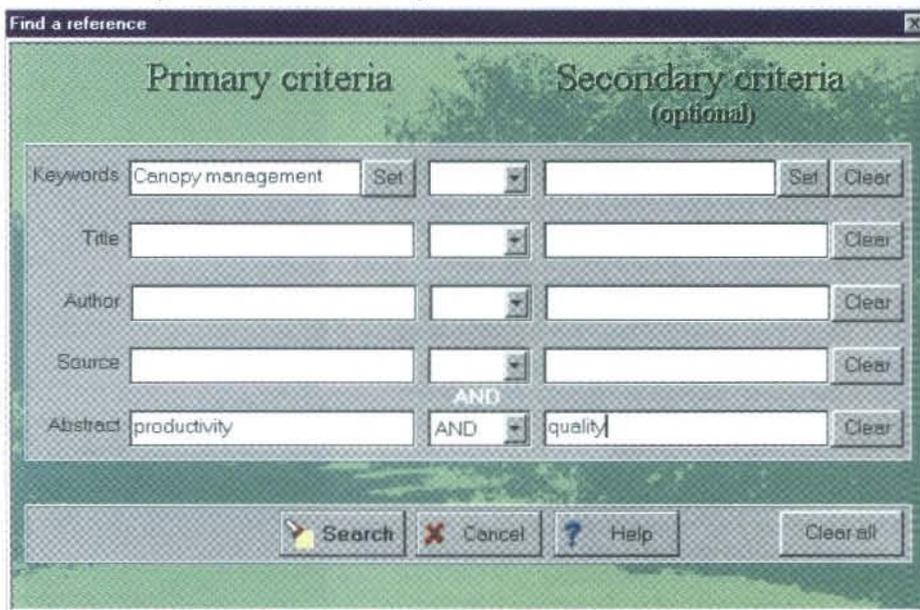
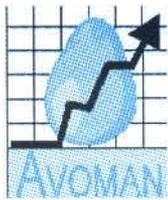


Figure 2. The AVOINFO search screen showing the five criteria that can be used to find information. If both the primary and secondary criteria are used they can be connected by "and" or "or".



- Biochemistry
- Biocontrol
- Breeding
- Country
- Cultivars
- Diseases
- Floral biology
- Fruit
- Fungicides
- Growth regulators
- Marketing
- Miscellaneous



AVOMAN PROJECT

AVOMAN users are now being kept up to date via the quarterly AVOMAN Newsletter, through Regional Productivity Group meetings and soon via an AVOMAN web site on the Internet. The first newsletter was sent out in December 1998. Any AVOMAN or AVOINFO Enquiries or orders should be directed to:

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 E-mail: avoman@dpi.qld.gov.au
 Phone: 07 5441 2211
 Fax: 07 5441 2235
 Toll free: 1800 816 541

- Nursery practices
- Orchard management
- Pests
- Physiology
- Plant nutrition
- Post harvest
- Soils

A few examples from using keywords associated with topical issues are given below:

Canopy Management

A search with the key word "Canopy management" yielded 46 references 31 of which had abstracts.

Marketing

Under the keyword "Marketing" AVOINFO found 210 references of which 108 had abstracts.

Figure 3. Reference found as a result of the search criteria used in figure 2, it includes a 1745 word article (under "Abstract available").

The screenshot shows the AVOINFO Reference Database interface. At the top, there are menu options: References, Bookmarks, Options, Print, Help. Below the menu is a search bar with "Result 1 of 1" and "Reference number 3883". There are buttons for "Set bookmark", "See bookmarks", "See all", "Search", and "Go to". The main content area is divided into three tabs: "Bibliographic details", "Abstract available", and "No figures available". The "Bibliographic details" tab is active, showing the following information:

- Title: Strategies for renewal of unproductive older avocado orchards with severe encroachment problems
- Author(s): Snijder, B. and Stassen, P.J.C.
- Address: Agriculture Research Council, Institute for Tropical and Subtropical Crops, Private Bag X11208, Nelspruit, 1200, Republic of South Africa
- Source: South African Avocado Growers' Association Yearbook, 16: 56-66, 1 table, 5 figs
- Published: 1995
- Language of publication: English

Irrigation

Using "Irrigation" as the key word located 145 references of which 82 had abstracts.

Clonal propagation

"Clonal propagation" yielded 46 references of which 35 had abstracts.

Abstract word searches

Another useful way of searching for information is to type a word or two into the abstract box(es) of the search screen (see Figure 2). If the word(s) you enter occurs anywhere within a reference's abstract then this reference will be displayed. The more words you enter, the more specific the search. For example typing "calcium" into the primary abstract box yields 123 references. Adding "quality" to the

secondary box and joining the two with "and" narrows the list down to 47 matched references. A search conducted with "Sunny" in the first box connected by "or" to "uniconazol" in the second found 3 references that related to the new growth regulant - not bad considering the product has only just appeared in Australia and has been kept under wraps overseas.

Sorting and Printing

References can be sorted according to year of publication, original language and reference number. A bookmarking facility can be used to instantly return to references of interest. Any of the references (including abstracts) can be printed.

Availability

AVOINFO is available on CD and can be run on any IBM compatible computer equipped with Windows 3.1 or later. It sells for only AUS \$125 for Australian levy paying growers (tax deductible) and AUS \$250 for others. Multiple order discounts are available. Contact the AVOMAN team for orders.

All AVOMAN and other technical articles and reports published in this magazine are sponsored by the HRDC and the avocado industry.

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Fruit Spotting Bug Report

By Dr Shaun Hood, Queensland Horticulture Institute,
Maroochy Research Station Nambour Qld



Depending on which crop you have, spotting bug activity may well be a thing of the past – that is until next season! If you are one of the lucky ones, spare a thought for those who have a much longer period when the spotting bug can damage their crop.

At the moment, the spotting bug is likely to be having lunch at your place if you are growing avocado, longan, passionfruit or jackfruit. Those of you who are growing macadamia may well have thought the spotting bug had moved on. In fact, if you haven't sprayed for a while, the bugs may well still be feeding in your orchard.

A trial carried out in February to evaluate a commercially available Pyrethrum formulation revealed spotting bugs are still active within the crop; all stages were collected (1st instars right through to adults).

In February we received nuts with recent spotting bug damage from Bundaberg, but the damage was restricted to the husk. The nuts appeared to be okay. As long as the damaged nuts don't fall prematurely, bug feeding at this time of year will have little effect on nut quality. Feeding trials performed at monthly intervals between October 1998 and January 1999 will help to pinpoint the period when spotting bug is likely to damage the crop.

Did you know there are lots of other bugs around the world that cause just as many problems as our spotting bugs? A few bugs attack familiar crops like avocado, citrus, mango, macadamia, and pecan. Some other bugs damage crops that are not all that common in Australia, for example cashew, cassava, coconut, pepper and guava. There are also bugs that feed on plantation wood like Eucalyptus and white cedar and some prefer ornamentals like mock orange and Poinciana. By studying overseas research on related bugs, we may discover better management techniques that could help us with our bug problem.

What have we been up to since the last report?

We have been working on our next HRDC milestone report due on the 30 May 1999, specifically this milestone aims to:

- Determine the time lag from bug feeding to visible symptoms on the fruit so as to fine-tune monitoring decisions in avocado, macadamia and custard apple.

- Identify the period when avocado, macadamia and custard apple crops are susceptible to bugs so as to refine the current spray schedules.
- Evaluate a range of chemicals so as to identify the best chemical(s) for progressing to registration or further testing next season.

To achieve these milestones we have been working on several experiments. Some experiments are still in progress so we will wait until they are complete before we jump to any conclusions. Vivienne Doogan (Senior Biometrician with Animal Research Institute at Yeerongpilly) is currently helping with the data analysis so that the results will be statistically valid.

Results from our chemical residue trial

Last November and December an experiment was performed to evaluate the residual activity of three insecticides.

The trial was designed to complement an earlier set of chemical bioassay experiments, in which Gus Campbell (NSW Department of Agriculture) established the LD95's for a range of technical grade insecticides (LD95's is the dose required to kill 95% of the treated population). Gus recommends that the commercial formulations he trialed be evaluated in the field.

In the past four months Geoff Waite has been evaluating a range of insecticides in both an avocado and macadamia orchard; these results will appear in the next HRDC milestone report.

Warning

THESE RESULTS DO NOT IN ANY WAY FORM A RECOMMENDATION TO USE ANY PARTICULAR PRODUCT – YOU CAN ONLY USE THOSE PRODUCTS THAT ARE CURRENTLY REGISTERED FOR USE IN YOUR PARTICULAR CROP

This experiment was designed to evaluate just how effective the insecticides were at various intervals after spraying. In other words if you sprayed today, how effective would the insecticide be a week later?

The results suggest that one of the chemicals shows promise and should still be effective a week after being applied. Of course these results are based on a specific set of weather conditions, some of which

may have influenced the results. It is important to note that some or all products may have performed better or lasted longer if a synergist, sticker or wetting agent had been used.

What do we have planned for the next three months?

We will continue experiments already in progress.

Although spotting bug activity may be starting to decline, we have a few experiments that still need to be completed. Some of you may be interested to know that our feeding/damage trials were extended to include custard apples. This, along with the avocado and macadamia feeding damage data, will identify just how spotting bug damage is expressed throughout the season.

Avocado fruit collected at intervals throughout the insecticide trials will be processed so as to establish the most appropriate maximum residue levels. This data will be used to ensure the product is registered in the not too distant future.

How do insecticides affect the beneficials?

In the December issue we mentioned we were going to quantify the effect of beneficials and other mortality factors. Unfortunately, poor weather and other experimental priorities meant we were unable to complete these experiments.

For those interested in how the beneficials fit into our research objectives it is worth noting that we still plan to investigate how various insecticide treatments affect a range of predators and parasites.

As a result of the chemical bioassay experiments, Gus Campbell recommended some of the more promising insecticides be evaluated in terms of their compatibility with potential biological controls. This evaluation is planned for later on in the year, probably during the cooler winter months when spotting bugs are over-wintering.

We will continue to identify high-risk orchard types

Identifying high-risk orchard types is an important aspect of the project. Why is it



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

that some orchards are extremely susceptible, whereas others hardly ever have a problem?

By getting information from as many growers as we can about how they control the spotting bug, we can develop ways to

better manage the pest. Hot spots are a very real phenomenon.

Any one or combinations of the following are typically associated with high spotting bug damage levels: it could be a certain variety, the edge of an orchard, a

patch of native scrub, the bottom of a hill, a creek or even a dense closed tree canopy. In the next few months we will be out and about to have a look at as many orchards as we can, so don't be surprised if we knock on your door.

Raising bugs

By Russell Parker, Queensland Horticulture Institute, Maroochy Research Station Nambour Qld

Why keep spotting bug colonies in the lab?

If spotting bugs are such a major pest, why do we need to keep and breed them up?

As part of the spotting bug project, experiments with the bugs are necessary to reveal more about their behaviour, ecology and control. To do that we need a regular supply of adults, juveniles and eggs.

Often the bugs can be used in an experiment and returned to the culture, though hopefully they won't all survive in the insecticide trials!

We could go out and collect bugs from the field whenever we need them for experiments, but bugs aren't always easy to find in the wild. When was the last time you saw one? We often need over 50 bugs at a time to make sure our experiments are statistically valid.

Although raising bugs can be very time-consuming, it is still more efficient and reliable than collecting bugs from the field. We often need to know the exact age, diet and history of the bugs we use in experiments as it might influence the result.

For example, our avocado feeding/damage experiment won't work if the bugs haven't fed on an avocado before, as they won't necessarily recognise it as food straight away. The bugs need to be "conditioned" on a diet of avocados before we introduce them to the fruit in the field.

As you can see it's necessary to maintain a culture of both species in order to have adults, juveniles and eggs available whenever we need them.

How do we maintain our spotting bug colony?

The answer is with lots of care and attention. Bugs in captivity can be very touchy and die for seemingly no apparent reason.

We rear both fruitspotting (*Amblypelta nitida*) and banana-spotting (*Amblypelta lutescens*) bugs in clear plastic containers in an outside insectary. The containers are

lined with absorbent paper (bugs are very messy!) and provided with moisture (dental wicks dipped in sterilised water) and all the food they can eat. French beans are provided as a staple diet as the bugs happily feed on them all year round. Additional food is supplied according to bug preferences—currently while the fruitspotting bugs are getting longans and guava the banana-spotting bugs are getting papaw. The bugs are provided with fresh food twice a week and their cages thoroughly cleaned once a week.

The adults are stored in groups of 20 bugs per container (10 male and 10 female) and any eggs they produce are collected and placed into smaller plastic containers. Once these eggs hatch and moult from 1st to 2nd instar, they are placed in large plastic containers and reared through to adults. By dividing up and counting the different life stages, we are able to get accurate information on the bugs' biology.



The articles on this page are sponsored by HRDC and the avocado industry.

What information are we getting from the colonies?

An important part of the spotting bug project is to study the biology of the bugs. We need this information to assist in developing better control measures for the pest.

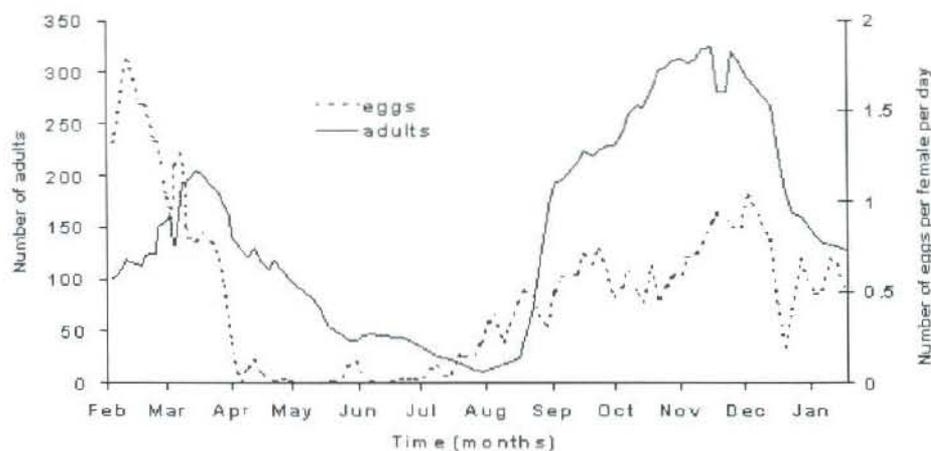
By maintaining a culture we are able to get detailed information on the lifecycle of the bugs. We can determine how long each life stage takes, how long the bugs live for, even how many eggs they lay. All this information can then be related to environmental variables like temperature and humidity.

What have the lab colonies been up to in the past year?

As you can see we stand to learn a lot about the ecology and behaviour of the bugs simply by recording some basic biological data. To illustrate the type of data collected let's look at some of the information generated while maintaining the fruitspotting bug colony (*Amblypelta nitida*). Before you ask, YES we have an

22

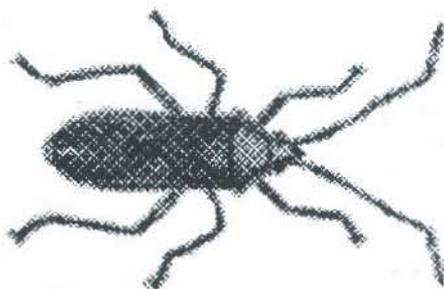
Figure 1. Number adult fruitspotting bugs (*Amblypelta nitida*) and the average number of eggs laid per female per day in the outside insectary at Maroochy Research Station between February 1998 and January 1999.



identical data set for the banana-spotting bug (*Amblypelta lutescens*). However, because both species are almost identical in terms of numbers and egg production we will concentrate on just the fruitspotting bug in this discussion.

Spotting bugs appear to dislike extreme weather conditions. Not only did the size of the colony decline during the cooler winter months (i.e. May, June and July) it also decreased during the warmer humid weather at the end of December and early January (Figure 1). This later dip is somewhat surprising given many growers identify this as the worst time of the year for spotting bug activity.

Last year the lab colony appeared to peak twice. The first peak, which occurred around April, can be attributed to an earlier peak in egg production (i.e. February 1998, see Figure 1). Obviously more eggs eventually result in more adult bugs entering the



colony. At the moment egg production is again on the increase.

Last week female fruitspotting bugs were producing 0.72 eggs per day. Like last year, the number of adults is expected to increase around April, just as the juveniles complete their development.

Wild bugs in the native scrub are also presumably laying lots of eggs at the moment. However unlike the lab colony, wild bugs have a lot more to deal with. Not only will the weather influence their survival, they have to also contend with a range of

predators and egg parasites. In a frequently sprayed orchard, predators and parasites are unlikely to have much of an effect, however well timed insecticide applications will control their numbers.

The second peak occurring around September was somewhat artificially induced. As the bugs became more active we were able to find them in the field. If they weren't watching and we were quick enough, these bugs were collected and added to the colony.

Since September 1998 we collected a massive 676 fruitspotting bugs (169 males, 186 females and 321 nymphs) from a range of hosts including avocado, citrus, jaboticaba, jackfruit, longan, lychee, macadamia, mango, mock orange and mulberry just to name a few.

Geoff Waite recently had a paper published describing the host range of each species, we will highlight this paper in a forthcoming issue.

Fruitspotting Bugs Around The World

By Geoff Waite, Queensland Horticulture Institute, Maroochy Research Station Nambour Qld

The Australian fruitspotting bugs belong to the Order Hemiptera, Family Coreidae. Within that family, they are placed in the genus *Amblypelta*, of which we have two problem species - *A. nitida* and *A. lutescens lutescens*. There is another species - *A. brevicornis* that is distributed throughout inland Queensland. It is not recorded as a pest yet, though I would not be surprised if at some time in the future it becomes a pest of olives, an increasingly popular crop throughout its habitat range.

The genus *Amblypelta* is made up of fifteen species, with the other twelve occurring through Torres Strait and Papua New Guinea and around to the Solomon Islands and New Caledonia

A. lutescens lutescens, our banana-spotting bug, gives way in the Torres Strait to a closely-related species *A. lutescens papuensis*. The literature records that this species feeds on rubber and cassava and I have seen large numbers feeding on *Poinciana* and the pods of a climbing bean, on Murray Island. It extends into Papua New Guinea where it is joined by *A. theobromae*, a pest of rubber, cassava and cocoa. The numerous other species that occur throughout the region all attack at least a few food crops each.

The species that causes the most problems is *A. cocophaga*. An examination of its recorded hosts reveals that it occupies a similar niche to *A. lutescens* in Queensland. In the Solomon Islands *Amblypelta cocophaga* causes severe damage to coconuts and plantation *Eucalyptus deglupta*.

To the west and north of Papua New Guinea, the Coreid genus of interest changes from *Amblypelta* to *Dasygnus*.

In the islands of Indonesia and in Malaysia, the pepper bug *Dasygnus piperis* is a major pest of pepper. However, one of the *Amblypelta* species - *A. manihotis*, which is common in New Guinea and feeds on cassava, also occurs in Indonesia. Other Coreids undoubtedly occur throughout SE Asia but there are no records of their causing problems to crops.

In 1990, in southern China, I collected a species of *Paradasynus* (probably *P. spinosus*) on mock orange, *Murraya paniculata*, in Guangzhou.

Mock orange is one of the favourite hosts for both of our species and it is interesting to note the similar niches colonised by related bug species in different countries. It seems that neither this species nor others that might be present in China, are pests of

crops. However, that may be an illusion associated with the difficulty of accessing Chinese literature (or at least having it translated to discover what it says)

I have recently received a translated paper from Taiwan which describes the damage inflicted by *Paradasynus spinosus* (described as the fruitspotting bug) on avocados there, and the damage is exactly the same as we experience here with *Amblypelta*.

Avocado is a new crop for Taiwan and that may explain why I was not made aware of the problem on my visit there in 1990. Unlike *Amblypelta* spp. that lay their eggs singly, this species lays its eggs in clusters of 40-50. Aggregations of large numbers of nymphs on *Melia azadarach* (white cedar) trees are common.

An undescribed egg parasitoid has been found to parasitize 40-90% of its eggs. This same bug species causes damage to citrus in Japan.

The genus *Paradasynus* turns up again in India where *Paradasynus rostratus* attacks coconuts and causes damage similar to that caused to coconuts in the Solomon Islands



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by *A. cocophaga*. Populations as low as one bug per tree can cause significant damage, and typical fruitspotting bug lesions appear on the nuts.

In east Africa, *Pseudotheraptus wayi* (the coconut bug), is a major pest of coconuts and has been recognised as such since the early 1950's. It was originally recorded from Zanzibar, Kenya and Tanganyika (Tanzania) but in the 1980's, it turned up in South Africa and developed a taste for alternative host fruits. It is now recognised as a pest of mango, avocado, macadamia, pecans and guavas in South Africa and will probably go on to become a problem in a wide range of hosts similar to our *Amblypelta* species, and cause the same type of damage. It attacks cashews in Kenya and was expected to increase in importance as that crop became more widely grown.

In west Africa (Nigeria, Ghana and Cameroon), *Pseudotheraptus devastans* causes severe damage to coconuts if its predator, the red ant *Oechophylla longinoda*, is not present.

In South America, the coreid *Leptoglossus zonatus* is a pest of corn while *Phthia picta* damages tomatoes and pumpkins. In North America, two species of Coreids, *Leptoglossus clypealis* and *Leptoglossus occidentalis* (leafhoppers) are a problem in pistachios. They cause what the Americans term 'epicarp lesion' - the typical crinkled scars on the kernel and the discoloured lesions on the inside of the shell, which we see on macadamias and pecans from *Amblypelta* spp. feeding. The leafhopper pine seed bug of North America, *Leptoglossus corculus*, feeds on the seeds of loblolly pine and reduces seed yield.

Taking The Guesswork Out Of Climate

Knowing what's around the climate corner—and how to best manage the risks and opportunities the season may bring—can bring numerous benefits to Australia's primary producers. A new newsletter *Climag* produced by the Climate Variability in Agriculture R&D Program (CVAP) will give primary producers an insight into the latest research into climate variability.

Administered by the Land and Water Resources Research and Development Corporation (LWRRDC), CVAP is entering its third phase of research.

The *Climag* newsletter details the 20 new projects that will be funded during 1998-99—a total investment of \$4 million—that investigate the areas of climate prediction and impacts; adaptive R&D focus; the marketing of climate information and the extension and value of applications.

CVAP Coordinator, Dr Barry White, said that a better understanding of the extra influence of the Indian Ocean in shaping seasonal rainfall and temperature outlooks is just one example of knowledge gained through the work of the program. Indian Ocean temperature patterns now compliment those in the Pacific, particularly the El Niño and related patterns.

"Applying our recent and increasing knowledge of climate variability is a priority across the agricultural sector, from researchers and rural policy makers, to farmers and those involved in agribusiness," Dr White said.

To register on the *Climag* mailing list please contact Capital Public Affairs Consultants on (02) 6248 9344 or email <cpa@dynamite.com.au>.

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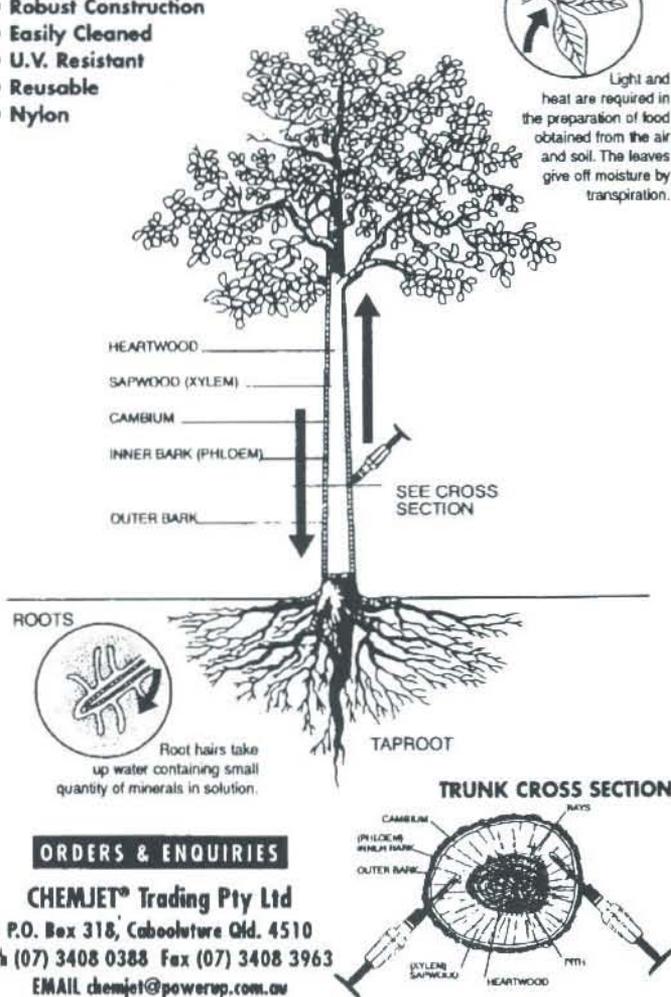
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Orchard Mulching Effects On Avocado Fruiting

An edited extract from a paper presented at Conference '97 by B.N Wolstenholme, C. S. Moore-Gordon and A.K. Cowan, Department of Horticultural Science, University of Natal, Pietermaritzburg, South Africa

Introduction

The South African avocado industry exports about 60% of the crop annually, mainly to France and the UK but also to many other mainly European markets. Record exports amounted to over 45,000 t, and in the absence of drought and other climatic hazards the potential exports from existing plantings may reach 55,000 t in the next season or two.

'Hass' has overtaken 'Fuerte' as the main cultivar and is well received overseas provided quality parameters are met. However, up to 50% of the Hass crop may be undersize (less than 200 g fruit weight, or with counts of 20 or more fruits per standard 4.5 kg export carton). In the 1994 season this "small fruit problem" was estimated to have cost the industry R30 million in lost export revenue.

The 'Hass' small fruit problem is not restricted to diseased, unhealthy or old trees. Even healthy trees produce 5-25% of small fruit.

There is anecdotal evidence that the problem is aggravated by high mean temperatures during fruit growth—specifically that 'Hass' fruit were 30% smaller in a warm subtropical coastal Queensland environment as compared to a cool subtropical highland environment (mean max/min temperatures for the 4 months preceding fruit maturity 28.6/19.0°C and 21.4/13.6°C respectively). More recently, it was noted that mean fruit size over 4 years was 195.0 ± 6.5 g vs 227.9 ± 3.6 g for these two localities, representing a 17% increase at the cooler site.

In South Africa it is accepted that fruit from hotter, drier localities are smaller on average than that from cooler, moister (more mesic or "soft") environments. This may be partly explained by the relatively high respiration rate of 'Hass' fruit compared with 'Fuerte', especially at higher temperatures. Other factors affecting 'Hass' fruit size are cross- vs self-pollination, crop load, tree size and age. In general, heavy crop load (lower leaf to fruit ratio), larger tree size and older trees all reduce average fruit size. The major cause of course is genetic.

The above discussion relates to the more obvious environmental and horticultural causes of the 'Hass' small fruit syndrome. However, it is known that premature/early seed coat senescence is strongly associated with the small fruit phenotype. Early studies in Israel noted that the avocado seed coat is rich in growth hormones. It was also noted that there was a correlation between the appearance of pedicel "ringneck", which has been associated with environmental/physiological "stress", and both premature seed coat death and small fruit.

These observations led to the hypothesis that reduction of stress and promotion of root health should lead to a reduced proportion of phenotypically small 'Hass' fruit. Part of the reasoning was that ecologically the avocado tree evolved in a rainforest environment with a decomposing litter layer, and in that it is essentially a rather shallow-rooted "litter feeder", adapted to a mesic environment (i.e. the "subtropical" as opposed to "tropical" avocado).

One scientist believes that three aspects of evolution shaped avocado roots—frequent good rains, rapidly draining soils (exemplified by the high oxygen requirement of roots) and the rich surface organic mulch layer in which healthy feeder roots proliferate. Accordingly, a mulching trial was initiated in KwaZulu-Natal as a short-term solution to improve the small fruit problem.

Subsequently, much has been learned about the physiology of avocado fruit growth. The small fruit problem has been defined and a long-term solution depends on a better understanding of the physiology and molecular biology of fruit growth. Recent publications, generated from the mulching trial in the first instance, cover both horticultural aspects, as well as physiology.

Materials and methods

A mulching trial was initiated in February 1993 on 6 year old 'Hass' trees on clonal 'Duke 7' rootstock, spaced 7 x 7 m, at Everdon Estate near Howick in the KwaZulu-Natal mist-belt (30°16'E, 29°27'S). Mean max/min temperatures range from 26.1/15.0°C in January to 19.4/6.7°C in July. The altitude is 1080 m,

and with a summer maximum rainfall mean of 1052 mm. The climate is cool to cold subtropical and conducive to high 'Hass' yields. The soil is an oxisol of the Hutton form, dystrophic, with a subsoil clay content of about 50%. The orchard received excellent management care including fertilisation and microjet irrigation.

A commercial composted pine bark mulch (coarse potting mix) supplied by Gromed Organics was applied to a depth of 15 cm, under the drip of six trees (total of 1.5 m³), with six adjacent unmulched trees as control. This mulch was chosen because of its good physical properties and its long half-life of about 5 years, which implies that the high initial cost could be amortized over a number of years.

The mulching trial has run for four consecutive seasons, during which data were collected on the major phenological events—fruit growth, fruit number and size at harvest. In two seasons, records were kept of the incidence of pedicel "ringneck" in relation to seed coat health and fruit size at harvest. Fruit was sampled for anatomy and physiology studies.

For 20 months, infrared thermometry sensors were used to monitor canopy temperatures, as a measure of water stress. Regular trunk bark samples were taken to determine fluctuations in starch reserves on a seasonal basis. A plant stress metre was also used to monitor chlorophyll fluorescence as a measure of photosynthetic efficiency and photoinhibition of photosynthesis.

To determine mulching effects on fruit size distribution, fruits were classified into three categories, viz. highly suitable for export - counts 14-18 (per 4.5 kg carton); suitable - counts 10-12 and 20-22; and unsuitable - counts ≥24.

Results

Yield and fruit size

Results for three consecutive seasons are summarized in Table 1. The first and third seasons were "on" years with control trees



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TECHNICAL REPORT

averaging 101 kg and 151 kg/tree respectively, while the second season was an "off" year (47 kg/tree). However, in all three seasons mulching significantly increased yields, by 18.5% and 18.9% in the "on" years, 42.2% in the "off" year, giving an overall increase of 22.6%. It is noteworthy that mulching benefits on yield were proportionally greatest during the "off" year. Three year mean yields were equivalent to 20.4 t/ha and 24.9 t/ha in unmulched and mulched trees respectively.

Mean fruit weight, surprisingly, was lowest in the "off" year and highest in the year of heaviest cropping. Mulched tree fruit weight was significantly heavier in the first two seasons (in both cases by 11.8%) but not in the third season of very high yield. Consequently the three season average increase in fruit mass was only 6.6%, but this was achieved despite a significant 14.7% increase in fruit number. Only in the first season, when the mulch had only been applied a few months before fruit set, was there no significant difference in fruit number (Table 1).

In all seasons, mulching shifted fruits into smaller counts, i.e. larger fruit sizes. The numbers of fruits in the "small" counts of 22-26, plus factory grade, were greatly reduced relative to unmulched trees. Overall, mulching resulted in a 14.3 ± 1.2 g increase in fruit mass, representing a shift of one count size in favour of larger fruit.

In terms of suitability for export, results showed that mulched trees produced 45% more fruits in the "highly suitable for

export" category (3 season average), and in the "acceptable" category by 20%. The number of "unsuitable" fruits was reduced by 29%. A partial economic analysis, based only on the costs of the particular mulch used, showed that the initial cost was offset in the second season. Four-and-a-half years later, there has been no need to replenish the mulch (which has an estimated half-life of 5 years).

Phenology

No marked differences were found for the time of shoot flushing, with the spring flush being more vigorous than the summer flush in all trees. Mulched trees had slightly more vigorous flushes. However, flushing of surface feeder roots, measured under a newspaper mat, was always more pronounced in mulched than unmulched trees.

Root growth ratings showed the expected spring/early summer (lower) and late summer/autumn (higher) peaks. Unmulched tree ratings were mostly scored in the "poor" category, only rating "medium" during the summer/autumn flush. In contrast, mulched trees rated mostly in the "medium" category, with "good" ratings during the second flush. The onset and duration of root flushes was both earlier and more prolonged in mulched trees, where root proliferation within the mulch was prominent.

No differences between treatments were found in periods or intensity of flowering. In the second two seasons, following colder winters, peak flowering was delayed by about 1 month.

Carbohydrate cycling

The bark starch concentration showed typical seasonal variations, in the range from 2-3% in late summer to 7-9% in late winter just before flowering. The low yield season of 1994/95 followed a relatively low starch peak during winter 1994, while the very high yields of 1995/96 followed a high starch peak in winter 1995. There was a tendency for peak concentrations (but not troughs) to be higher in mulched trees. The same trend was noted for trunk bark sugar concentrations.

Physiological disorders

Mulched trees had an average of 38.6% reduced incidence of dead seed coats at harvest maturity in the two seasons. The low incidence of below 20% in 1995/96 contrasted with a 55.7% reduction in seed coat death in 1994/95.

For pedicel "ringneck", an average of 13.4% of control fruits suffered whereas only 7.1% of mulched fruits were affected, an average of 47.0% reduction. The relatively low figure is indicative of the comparatively non-stressful, mesic environment.

Canopy temperature and photoinhibition

Two seasons' data (1994/95 and 1995/96) indicated that canopy temperature exceeded air temperature by between 0.5°C and 6°C in unmulched trees. A dramatic rise in leaf canopy temperature relative to air temperature occurred from February through April or May. At midday during this "stress period", leaf temperature of unmulched trees was up to 3°C higher than in mulched trees.

The Fv/Fm ratio, a measure of chlorophyll fluorescence, was typically also lower at midday in unmulched trees than mulched trees. Both these parameters indicate less stressed mulched trees, with more open stomates (faster transpiration rates) and less photoinhibited leaves.

Discussion and conclusions

Yield and fruit size in avocado are under the control of many interacting factors, including genetic make-up, climatic extremes, poor flowering and poor pollination, and vegetative-reproductive competition. Furthermore, a host of as yet poorly understood physiological events impact on the critical early and main periods of fruit growth when size is determined—in particular the time at which seed coat deterioration sets in.

Our studies have clearly shown that from a horticultural viewpoint there is much to

Table 1 Summary of the effects of pinebark mulching on 'Hass' avocado productivity. Figures are means of six trees.

**** denotes a significant increase in response to mulching.**

	Control	Mulch	Percentage increase
1993/1994			
Mean fruit mass (g)	198	221.3	11.8**
Fruit number/tree	509	540	6.1
Yield (kg/tree)	101	119	18.5**
1994/1995			
Mean fruit mass (g)	178.2	199.2	11.8**
Fruit number/tree	262	333	27.2**
Yield (kg/tree)	47	67	42.2**
1995/1996			
Mean fruit mass (g)	216.1	220.4	2.0
Fruit number/tree	698	814	16.6**
Yield (kg/tree)	151	179	18.9**
Overall			
Mean fruit mass (g)	203.1	216.5	6.6**
Fruit number/tree	509	540	14.7**
Yield (kg/tree)	100	122	22.6**

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be gained by reinforcing the natural dead litter mulch under healthy avocado trees. In two out of three seasons we obtained meaningful increases in fruit size despite fairly substantial yield increases, and even in a very heavy cropping season (32 and 36 t/ha in unmulched and mulched trees) mulching maintained mean fruit size at about 220 g.

Overall, average increases over three seasons of 7% in fruit size, 15% in fruit number and 23% in yield in mulched trees are dramatic, especially in a well-managed orchard in a relatively mesic, non-stressful environment. When fruit size distributions in desirable export counts are compared, mulching benefits were even more obvious.

Our results from the phenological and physiological parameters studied provide much evidence that alleviation of physiological stress through improved root growth is at least part of the explanation of mulching benefits. Root growth was greatly improved by mulching; there was evidence of more prolonged seed coat viability and reduced ringneck; somewhat higher storage starch peaks; cooler (less stressed) canopies in summer and autumn, and less photoinhibited (photosynthetically more efficient) leaves.

More detailed anatomical studies not described in detail in this article have furthermore shown that growth of phenotypically small fruit is limited by cell number and not cell size. In addition, small fruits can be chemically induced by injecting ABA (abscisic acid, a growth inhibiting hormone) and mevastatin (an inhibitor of isoprenoid

biosynthesis) into the fruit stalk during fruit development. Co-treatment with a growth promoting cytokinin hormone negated the effect of both ABA and mevastatin.

Small fruits have increased flesh concentrations of ABA and reduced levels of the enzyme affected by mevastatin. The results suggest that the cytokinin/ABA ratio is a key to fruit size, with small fruits low in cytokinin (a cell division factor) and high in ABA (related to water stress).

The above evidence for a role for "stress" in the small fruit syndrome is convincing, but only part of the story. There are many other benefits of mulching including water conservation, improved root growth, reduced physiological stress, a more mesic edaphic environment, promotion of "suppressive soils" for reduction of root diseases, provision of minerals for improved root growth (P, Ca, B) and tree growth, and it may improve weed control. It has also been found that soil boron applications in deficient Queensland soils improved 'Hass' fruit size by 11-15%.

Our pinebark mulch is believed to have supplied added boron during decomposition, and improved feeder root growth, increasing foraging efficiency. This mulch had a C:N ratio of 37:1 and a N content of 1.1%, so there was no danger of a nitrogen "draw-down".

We have initiated another trial comparing pinebark with filter-press cake from sugarcane mills, at Cooling Farm near Wartburg.

The composted pine bark mulch used in our trial was a relatively expensive but long-term product with excellent physical properties. The choice of mulching

material for avocado orchards will be affected by many factors, not least availability (e.g. filter-press cake from sugarcane in KwaZulu-Natal), C:N ratio (ideally between 25:1 and 100:1) and rapidity of decomposition.

For more rapidly decomposed mulches, time of application is important (winter/early spring) so that potential soil wetness problems in heavy summer rains are not aggravated. The contribution of mulches to nutrition must be taken into account and monitored by soil and leaf analysis. There are both pros and cons to mulching, and mulches must be used correctly.

Conclusion

In conclusion, the evolutionary history of the avocado tree suggests that it will, in most orchard circumstances, be responsive to mulching. We present evidence from an ongoing mulching trial that substantial yield increases, made possible by both increased fruit number and fruit size, can be achieved even in a relatively non-stressful summer rainfall environment.

Improved tree performance was partly due to alleviation of stress, but probably also due to an improved root environment and improved nutrient uptake. Careful choice of type of mulch is necessary, and ultimately mulching is an economic decision. The use of inter alia orchard prunings as mulch material is common sense. Awareness of the pros and cons of mulching relative to the particular orchard situation, and monitoring of water relations and mineral nutrition, is fundamental to success.

What Is Phenology

Simply stated, phenology is the study of the response of living organisms to seasonal and climatic changes to the environment in which they live. Seasonal changes include variations in the duration of sunlight, precipitation, temperature and other life-controlling factors.

The following are examples of the response to seasons of plants and animals that are frequently tracked by people interested in phenology:

- Plant growth and floral blooms in the Spring, Summer and Autumn.
- Spring and Fall migration patterns of some bird and mammal species.
- Denning and emergence dates of hibernating bears and chipmunks.
- Appearance of fireflies, mosquitoes and other insects.

- Fruiting and harvest dates of various cultivated plant species and associated insect pests.

Cyclic events are tracked for specific plants and animals from year to year so that comparisons and trends can be analysed. Observations are generally made from year to year from the same site and sometimes from the same individual plant or animal. For example the dates of the first leaf, the first flower, and full flowering are often tracked on lilacs and other cultivated and wild plants.

Data from the same site can be studied from year to year for seasonal comparisons and the role that varying temperature, moisture, sunlight, etc. plays on plant and animal phenology. Observations can also be shared among phenologists during the

same year from multiple locations across the country. This allows us to watch the progression of migrations (in the case of birds) or the "green wave" of growth (in the case of plants) as each progresses from South to North each Spring.

Who Is Interested In Phenology

Today many people are interested in phenology simply for an entertaining and educational way to enjoy their nature observations. Farmers and fruit growers use phenological data as a tool in knowing when to plant and harvest crops and in some case when to apply herbicides or insecticides.



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The Purpose and Goal of Phenology

By Mary Lu Arpaia, Department of Botany and Plant Science, University of California, Riverside

Development of a phenology model for avocados could greatly enhance a grower's ability to plan management practices in relation to the events occurring within the tree. Knowledge of the time of root and shoot growth, flowering and fruit set, and the relationships between these events and carbohydrate utilisation within the tree will allow for application of irrigation, fertilisation, and other cultural practices at optimum times.

Another goal is to define the changes in carbohydrate partitioning in relation to phenological events in Hass avocado trees in an attempt to understand the factors involved in alternate bearing.

The California avocado industry exists on the interface of the urban agriculture complex of southern California. In order to maintain the viability of the avocado industry in such a challenging environment, growers must develop the necessary tools to maximise productivity while minimising inputs into the agricultural system. Characterisation of the changes in the avocado in relationship to the cyclical bearing habit of the tree will also aid in developing cultural management strategies that will minimise alternate bearing.

It has been proposed that productivity management in avocado trees is dependent on the management of carbohydrate in the tree. The management of carbohydrate in this context refers to the accumulation and mobilisation of assimilates to ensure that the flowering event is successful in terms of consistent annual fruit set, fruit retention is at an acceptable level, vegetative growth is balanced without becoming highly competitive with fruit yield, and root growth is maintained and the crop matures with acceptable quality.

Based on significant correlations between reserve carbohydrate (starch) prior to flowering and fruit set in citrus and avocados it was proposed integrating a starch curve with phenological growth models developed in Australia and South Africa to be used as a quantitative index for predicting potential yield.

Using data from work by researchers, an annual starch curve for avocado trees has been developed. When related to the phenological cycle, starch reserves in the wood of trunks are at their highest during the prolonged winter rest period when growth demands are lowest. Starch reserves fall rapidly during flowering and fruit set,

and reach their lowest concentration during the summer fruit drop period before increasing to their winter maximum.

World production of avocados falls into 3 main climatic zones: cool, semi-arid climates with winter rainfall (characteristic of California); humid, subtropical with summer rainfall (South Africa) and tropical or semi-tropical with summer rainfall (Florida).

The phenological model proposed by researchers Whiley and Wolstenholme is based on trees growing in subtropical Australia and South Africa and was developed using grafted trees on seedling rootstocks. The growing conditions in these humid subtropical areas is quite different from California conditions. Clonal rootstocks are used in California orchards because of their resistance to *Phytophthora cinnamomi* and may affect the phenology of the tree by influencing scion behaviour.

We are interested in emerging results from Australia and South Africa that implement a starch curve with other phenological events as a quantitative index for predicting potential yield and yield alternation. However, using a starch curve in this manner is a simplistic approach to a complex issue. We have developed a preliminary phenological model for Hass avocado grown in California conditions and have also just completed a 2 year study of carbohydrate from the same trees. We have found that while starch serves as an important non-structural carbohydrate reserve in avocados, there may be an overlooked group of other non-structural carbohydrates which are in higher concentrations than starch. These are D-mannoheptulose and the alcohol sugars (polyols) dulcitol, perseitol (D-glycero-F-galacto-heptitol), and volemitol (D-glycero-D-mannoheptitol). Of the polyols detected, perseitol is clearly the dominant polyol found in avocado tissue, however, its precursor, D-mannoheptulose, is also found in high concentration. The other major polyols typically associated with other plant species, sorbitol and mannitol, are not found in appreciable amounts in avocado tissue. The proportion of D-mannoheptulose and polyols to total soluble sugars was high, with 50-90% being in this group. Common soluble sugars such as glucose, fructose, and sucrose were generally below 1% in dry samples.

Starch concentrations in these same samples ranged from 0.8% to 9.2% indicating

that starch is a major non-structural carbohydrate in avocado, although it may not play as important a role in regulation carbohydrate reserves as previously believed. The energy balance and carbohydrate budget of trees is thought to play a major part in alternate bearing and we believe this study will elucidate some of the factors involved in alternate bearing of avocado trees.

Our preliminary results suggest that avocado trees have unusually high concentrations of D-mannoheptulose and polyols compared with common soluble sugars and starch. The carbohydrate budget and overall energy balance of the tree is likely to be greatly influenced by these sugars.

According to the literature, little is known about this group of sugars and their quantitative analysis. This is probably due to their minor importance in other horticultural trees. It is interesting to note that recently D-mannoheptulose has been found to have anti-tumour growth function and is considered a potential treatment for cancer patients.

This study may play an important role in furthering information on the potential health benefits of consuming avocados.

As production costs continue to increase and market competition increases for the California industry, we need to look at ways to minimize costs while enhancing tree productivity. Canopy management can play a pivotal role in achieving this goal. Another critical components of orchard productivity can be related to tree spacing. Little work has recently been conducted except in South Africa pertaining to tree spacing.

It is highly possible that with the selection of upright trees such as the 'Lamb Hass' that high density plantings may be economically feasible. Tree pruning and trunk girdling are also cultural practices which have not been routinely practised in California, although elsewhere (such as Israel) these practices are utilized as tools to control vegetative growth while enhancing productivity. The majority of this work has been conducted in humid semi-tropical regions such as Australia and South Africa. The data we have collected will aid in developing canopy management practices that are designed for California conditions and therefore assist us in maximizing production.



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