



The Australian Newsline

# Talking Avocados



Vol 10 Number 2

June 1999



**Nola and Steve Philp, and Rod and Val Dart  
Winners of "Natures Champion" Awards  
Pictured with John Bolton (Centre), Co-op Chairman**

- Genetics
- Chemicals Registered for use on Avocados
- Government Initiative on Horticulture
- Preparing Avocados for Market

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### Imagingsetting

MacBureau, Currumbin

### Printing

H.W. Inprint Pty Ltd, Devonport

ISSN 1039-2394

This publication is distributed free to all Australian avocado growers and is available on subscription.

Australia - \$25 (\$48 for 2 years)

NZ - \$35 (\$68 for 2 years)

Other Overseas Countries \$40 (\$78 for 2 years)

Australian currency only.

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Talking Avocados is the official magazine of the Australian Avocado Growers' Federation and in conjunction with the Australian Horticultural Corporation is published four times a year (March, June, September and December).

This publication is distributed upon the understanding that the publisher is not engaged in legal, cultural or other professional advice. The Editor, Directors and Executive Officers of the Australian Avocado Growers' Federation Inc (ACN Number IA 5122) do not accept any liability for and/or necessary endorse and/or concern and/or support any of the claims and/or statements made and/or views and/or opinions expressed anywhere in any edition of "Talking Avocados".

## Calendar of Events

### June

9 **Sunshine Coast Avocado Growers' Association** - Field Day at K. Smerdon's property, Lot 2, Old Gympie Road, Glass House Mountains. [See box on page 7 for details].

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

### July

1 **Sunshine Coast AVOMAN RPG Meeting and Farm Walk** - "Your Fertiliser Program and Fruit Quality" - plant nutrition, fruit quality including presentations, practical aspects, a farm walk and the use of AVOMAN to plan and record your fertiliser program. Venue to be announced. Contact Larissa Meyer Ph 07 5478 9455.

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

### August

3 **Avocado Growers' Association of WA Annual General Meeting** - Conference Room, Market City, commencing 5.30 p.m.

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

### September

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

### Front Cover:

L. to R. - Nola and Steve Philp, John Bolton (Co-op Chairman) and Rod and Val Dart pictured with the 'Natures Champion' awards.

### Back Cover:

Fruitspotting bugs are the subject of a continuing project funded by the avocado, macadamia and custard apple industries. Picture shows the adult and a nymph of *Amblypelta nitida*.

## Natures Champions - Philp Orchards and Montrose Nominees

Philp Orchards near Hampton, north of Toowoomba, and Montrose Nominees at Mt Tamborine in the Gold Coast hinterland, have taken out the inaugural 'Natures Champion' awards. The Sunshine Fruit Co-op Ltd (trading as Natures Fruit Company) created the awards last year.

Board Chairman, John Bolton, said at the time of announcing the awards, "At last we're acknowledging those avocado growers who make that extra effort to produce an outstanding product." [See cover]

The awards are broken into two categories, less than 2500 avocado trays and more than 2500 avocado trays.

Presentation of the prestigious awards took place at the Cooperative's Annual General Meeting. Following the presentations, Rod Dart of Montrose Nominees (which won the over 2500 trays award), said a lot of his and his wife Val's success was due to their expert horticultural advice. "We've followed advice on fertilising, soil and leaf testing, water and spray programs. That's what gives you a good fruit size."

The Dart property, developed 'from scratch' ten years ago, has 400 Hass trees ranging in age from five to nine years. Last year for the whole crop, they averaged 85% for packs 18 down to 25. Their top percentage bin pack out was 94.11%.

Rod Dart said they were "thrilled to bits" with the award. "We're very proud of our fruit, and quality is what we strive for. You can't sit on your verandah for six months and expect your avocados to grow. It's hard work and very satisfying when you see the rewards."

Steve Philp of Philp Orchards, who won the 'Natures Champion' award for up to 2500 trays, said it was nice to win something for your efforts. "As well as being the first one's, it gives you recognition for having a quality product."

Philp Orchards is a family partnership of third generation avocado growers, comprising Steve and Nola Philp and brother David and his wife Alice. Their 20 acre orchard of 940 Hass trees is only four years old, having been carved from the bush just five years ago.

Steve Philp also praised the work of his horticultural consultant who, he said, must take some of the credit for their award.

"His guidance and advice with the property's fertilising, spraying and irrigation programs have definitely helped us to achieve high quality fruit percentages.

"Last year we averaged out at 76% premium grade fruit over the whole season and we're very optimistic for our farm's future, given time."

Both recipients praised Natures Fruit Company for initiating the awards. Steve Philp said, "It creates friendly rivalries within the co-op membership to achieve a high quality product. And after all, if you have better fruit to market, that's half the battle already won."

Rod Dart spoke of being very pleased with their five-year association with the cooperative. "Natures Fruit Company is a recognised force in the market place, unobtainable on your own. These awards can only strengthen the company's drive for quality excellence," he said.

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# Peak Body For Horticulture

*From National Marketplace News, May, 1999*

Australian horticulture will soon have a Peak Industry Forum (PIF) to represent its collective interests, based on the outcome of a two day workshop held in Melbourne in April.

The workshop brought together about 70 representatives from the various sectors of horticulture who together formulated the basis for the development of a PIF to represent Australia's \$4.5 billion horticulture industry.

Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry, Senator Judith Troeth, believes the time is right for horticulture to move into the next millennium as one united, collective voice.

"In terms of dealing with the government, industry is far more persuasive when it acts collectively and speaks with one voice. It is hard for consensus or an outcome to be reached when the government is dealing with a large number of fragmented industry groups," Senator Troeth said.

"If horticulture is not in a position to put forward its common view on how government should respond, then government will continually be faced with conflicting views within the industry."

The new body will replace the Commonwealth Government sponsored Horticulture 2000 Group that ceases in mid 1999. The Horticulture 2000 Group began in

1995 and has been acting as a quasi-peak industry forum. It is therefore necessary for the industry to consider an alternative forum if the efforts and progress made by the 2000 Group are to be continued.

Senator Troeth said, "Traditionally, horticulture has been poorly organised with heavy reliance on government efforts such as the Horticulture 2000 Group. The creation of a peak industry body has considerable potential to redefine the identity of horticulture within agriculture. Through better relationships with consumer groups, the media, international horticultural organisations and governments, an opportunity to realise a new phase of maturity is presented to horticulture."

## Implementation

An implementation team has been nominated to draft the memorandum and articles of association, together with providing resolution about membership and funding.

Queensland Fruit and Vegetable Growers chairman, Paul Ziebarth, said, "A very positive outcome was achieved across the broad range of industry commodity and agripolitical groups represented. I understand that the next step will be to devise details concerning membership of the forum, and its structure and funding."

Queensland Fruit and Vegetables General Manager, Bob Granger, who is also a member of the Horticulture 2000 Group, said that perhaps the most positive outcome the group has demonstrated is that industry can come together in a positive partnership with government.

Mr Granger also said that this relationship could develop very productive lines of communications on a range of very important national issues. The work of the Horticulture 2000 Group needs to continue on the basis of the industry furthering its own interests.

Some of the issues addressed by the group include food safety, contingency plans for the management of any emergencies, micro-economic reform and issues relating to trade and market access, taxation policy, industrial relations matters and new technologies such as GMOs.

The implementation team includes QFVG General Manager Bob Granger, who also chaired the two-day workshop.

Other members are Jeremy Gaylard of Australia United Fresh, Brian Newman of Ausveg, John Durham from the Apple and Pear Growers, Rod Fay from the Australian Macadamia Society and the Australian Nursery Industry's Greg Richards.

One of the first tasks of the implementation committee will be to produce a business plan and then to devise another workshop later this year to progress the recommendations of the first workshop.

# Salmonella In Packing Shed

*From National Marketplace News, May, 1999*

An outbreak of Salmonella poisoning from orange juice saw the closure of a Riverland fruit packing shed last month.

The source of the bacterial contamination was traced to Constat Bros packing shed, at Cooltong near Renmark. It is one of approximately 40 citrus packing sheds in the region.

Poor shed hygiene practices were the likely cause of the problem, according to South Australian Research and Development Institute chief scientist of horticulture, Barry Tugwell.

"The pathogen was isolated in two places; an in-line fungicide applicator and a wax applicator. It is my understanding that the shed in question had no quality assurance in place and there was no regular

practice of changing the dip solution," Mr Tugwell said.

In regard to contamination in the wax line, Mr Tugwell said: "The shed had an unusual system in place which involved recycling the wax. Most systems spray the wax on the produce and it is only used once. This system allowed contaminated wax to enter the applicator and infect other fruit passing through."

With the wax effectively sealing the bacteria to the orange surface, it was a safe trip for the pathogen to the juicing processor.

"The produce would enter a disinfecting wash solution at the juice processing plant, but this is not sufficient to kill pathogens on the fruit. It is sufficient to keep the wash water free of pathogen build up, but not

treat the produce. Add to this the fact that the fruit had been waxed and the chances of removing the contamination at this point are very low," he said.

## Contamination source

Bird droppings, chicken manure or rodents were likely sources of Salmonella contamination in sheds.

"Salmonella is commonly found in bird manure, so bird droppings on part of the packing line are a likely cause for the contamination. This is particularly true for sheds that are used infrequently and are settled by nesting birds. Another possible source is raw chicken manure used as fertiliser," Mr Tugwell said.

# Avocados - Good News From The Heart

## Studies confirm the benefits of folate in fighting heart disease.

"Folate deficiency is one of the most common vitamin deficiencies in the Western world," said Catherine Saxelby, Consultant Nutritionist for the Australian Horticultural Corporation.

Ms Saxelby said avocados were one of the best sources of folate, and were recently given approval to promote the presence of folate as a new health claim by the Australia and New Zealand Food Authority (ANZFA).

Avocados already carry the National Heart Foundation tick-of-approval, attributed to their role in reducing harmful cholesterol levels.

"Avocados are in a category of their own. We know that their mono-unsaturated fats assist in the lowering of cholesterol by controlling the 'bad' LDL-cholesterol in the blood, and the latest evidence supporting folate is more great news," said Ms Saxelby.

Studies have concluded that folate and vitamins B12 and B6 can protect against heart disease by reducing blood levels of homocysteine (a sulphur containing amino acid) produced by the body. When homocysteine levels are high, there is an increased risk of blood vessel damage and atherosclerosis.

"High homocysteine levels have been identified as an independent risk factor for heart problems which can be treated through diet modification. Folate is an important explanation for the antioxidant theory linking high vegetable and fruit intake

to lower rates of heart disease," said Ms Saxelby.

One of eight vitamins in the B group, folate has long been recognised for its role in the growth and reproduction of all body cells, and is essential for development of the brain and spinal cord in foetus.

### How Much Folate?

The recommended intake for adults is 200 micrograms of folate per day, 100 micrograms for children and 400 micrograms for pregnant women.

Half an avocado (90gm) contains around 60 micrograms of folate, which is more than many other fruits and vegetables such as oranges (43 micrograms), green beans (39 micrograms) and broccoli (38 micrograms).

### Avocados and Folate!

"The nutritional make-up of avocados is similar to that found in Mediterranean diets which has been proven so successful in fostering a healthy diet and in reducing the risk of heart disease," Ms Saxelby said.

The Mediterranean diet has been recognised for its low incidence of heart disease, attributed primarily to the levels of "good" fats such as mono-unsaturated, which are found in olives and olive oils.

Ms Saxelby emphasised that most people are still not getting enough folate.

A recent study at Wesley Hospital in Brisbane found that an avocado-enriched diet was more effective in lowering total

cholesterol than a standard low-fat high-carbohydrate diet.

The study, which involved 15 middle-aged female volunteers with normal blood cholesterol levels, found a decrease in harmful LDL-cholesterol levels and apolipoprotein B (a blood marker for heart problems), after including avocados in their daily diets.

The study provided further evidence that avocados with their high levels of mono-unsaturates are effective in reducing the risk of heart and cholesterol-related problems.

### Taking your Daily Folate

"Avocados make it really simple for people to incorporate more folate into their diets. Given that you do not need to cook avocados, the folate is not lost in the cooking process so all of the essential nutrients are retained," Ms Saxelby said.

Avocados can be a simple and tasty addition to a healthy eating plan, and they are available all year round.

Ms Saxelby's advice on avocados is:

- Use as a substitute for butter or other spreads on breads or biscuits.
- They are superb in tossed cold or warm salads.
- Mix into freshly cooked pasta with tomato, rocket and basil.
- Avocados are an excellent addition to your favourite sandwich.

## Avocados - Variety Is The Spice Of Life

Around the world, the avocado delights the palate of millions. From sushi rolls in Japan to guacamole in Mexico, the taste, texture and flavour of avocados adds a touch of variety to *spice* up our lives.

From January through to December, the many varieties of Australian avocados are in abundance, harvested from orchards throughout Queensland, Northern New South Wales, South Australia's Riverland district, Victoria's Sunraysia, and the South West of Western Australia.

Shepard Avocados, with their golden buttery texture and smooth green skin, start the Australian avocado season every year, with peak harvesting February to April.

The pear-shaped Fuerte avocado follows, maturing March to September with a peak

in May. This variety has a stronger flavour with a green skin that dulls on ripening.

During the winter months, the Sharwil and Wurtz varieties are at their peak. The large Reed avocados peak in November, and their size makes them ideal for families to share in salads or light meals.

The only dark-skinned avocado—the Hass—is one of the most well-known avocados, and is available from May to January. This variety turns a dark purple on ripening and has a nutty flavour.

Throughout all seasons of the year, avocados can be incorporated into a wide range of recipes and meal ideas.

**Prawn and Avocado Salad** - a taste of the tropics with this classic summer salad

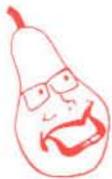
**Avocado and Mushroom Fettuccine** - for an Italian twist that is simple to make and even better to eat!

**Avocado with Bocconcini and Basil** - a great picnic dish with deliciously soft and creamy textures and flavours.

**Chicken and Avocado Burritos** - some like it hot - and you don't get much hotter than this great Mexican burrito, using lemon juice and plenty of chillies!

**Baked Fish with Avocado** - Australia loves seafood, and what could be a better accompaniment to the catch-of-the-day than avocados?

**Avocado with Oven-Roasted Vegetables** - nothing compliments the taste of Australian vegetables better than a light avocado sauce.



## TALKING AVOCADOS - HAVE YOUR SAY

Dear Sir,

I was disappointed to hear that the AAGF had turned down the opportunity to host the next World Avocado Conference following the upcoming one in Mexico.

Mexico, the originator of much of our rootstock and varieties, will be a most interesting venue for a conference.

Though a small and not particularly affluent country, I know they will produce a most interesting and thought provoking conference; I am sure we could do likewise.

Unfortunately, with the high cost of travel, many of our growers seldom have the chance to attend such a conference and will miss out on a wonderful opportunity. The chance to hear presentations on the great variety of research projects being undertaken in all the different countries and to mix and talk to the scientists and growers from those countries is an invaluable experience. Most of the research personnel are quite anxious to attend and have the opportunity to present their papers on such an occasion.

If it is not too late, then I urge the Federation to reconsider their decision and accept the opportunity to host the World Conference. More, I believe it is their duty to provide such an opportunity to their growers.  
*Concerned,  
A struggling Grower*  
[Name and address supplied. Ed]

Dear Sir,

How About A 12 kg Carton?

In the March '99 edition of Talking Avocados the Australian Horticultural Corporation (AHC) page, in reporting on the Marketing Forum, used a sentence that startled me. It said, "The Forum endorsed further research to improve packaging to suit all needs *in the current weight range*" (my italics).

I was startled because, following the report on avocado damage in the December '98 edition of Talking Avocados, I was sure there would be a concerted push to move to a 12 kg carton. Let me explain why I reached this conclusion favouring a 12 kg carton.

In the December edition an excellent report on Internal Quality by Story Horticultural Services provided some data on internal damage to avocados. The data was very persuasive. In brief the key points were:

- Some 50 to 60% of avocados sampled at retail level in a 1997 study had internal defects.

- In 1998 a rerun of the testing showed an internal defect rate 10% worse than 1997.
- The main quality defect was bruising. It accounted for 50% of all defects.
- Photos of bruised fruit showed a consistent pattern. The bruising was at the base of the fruit where it contacts the base of the insert.

What the report did not say was how this bruising occurred. I believe the cause can be pinpointed readily. The cause is a combination of the 6 kg carton and the palletising system we use. The mechanism is as follows:

- Fruit in a 6 kg carton in the bigger fruit sizes, 15,16,18, and 20, come into contact with the lid of the carton in varying degrees.
- Pallets are stacked 15-18 cartons high for carriage by semitrailer. Cartons at and near the bottom of these stacks carry a load that causes the cartons to sag and for the load to be carried by the fruit. The fruit is bruised as a consequence.
- The point of contact and thus load carrying in the fruit, is the base where it contacts the insert.

Based on this analysis there seems to be a narrow range of remedial actions available. We would find it difficult to get the transport companies to accept a lower stacked pallet—indeed the cost to the grower of increased freight charges would be significant. If we get a bigger and stronger but still 6 kg carton, the packaging costs would increase and perhaps freight costs as well.

There is a solution I am told, tried and tested elsewhere, that we could adopt. The US avocado industry uses a 25 lb loose fill carton and has done for many years. Because of its greater height and loose fill much stronger corners are part of the design. Some sagging of the carton can occur without the fruit taking vertical load. As I do not have first hand knowledge of US practice I rely here on what others have told me.

If US practice is as depicted then gaining information on US experience may well save on lengthy local trials. However, irrespective of US practice and experience there have been trials in Australia on both 12 kg and 18 kg cartons. At the time the response from market agents was very negative. Their view was that a 12 kg carton with only half the fruit visible with the lid off would lead growers into putting inferior fruit at the bottom—retailers agreed.

Whether this negative view was ever valid is irrelevant. Today any avocado packer of consequence is, or is becoming, QA certified. As well, large chains and fruit barns dominate fruit retailing. Any packer hiding poor fruit below good in a 12 kg carton would soon be found out and would lose major buyers as clients.

A 12 kg carton, loose filled, may not look "nice" but it does have advantages. The fruit finds its own nesting position. It is not forced or wedged into a preset position that has little regard to the varying shapes of avocado varieties. The volume occupied by 12 kg of nestled fruit is lower than the volume of 2 flat 6 kg pattern packs. Thus space is left to allow a safe air gap between the top of the fruit and the underside of the lid. As only one lid is used instead of two, a further small volume gain occurs.

The volume benefits can be used to build greater vertical strength into the carton without causing the height of a 12 kg carton to exceed the height of 2 x 6 kg cartons.

The bottom line in all this is quality. I suggest we can reduce the interior defect rate of avocados from its present unacceptable 50-60% by the use of 12 kg cartons. Based on the Story report, a reduction to 25-30% is feasible. (Still not good enough of course but it is a good start.)

Improved quality means greater consumer satisfaction, more repeat sales, more word of mouth commendations and ultimately higher total consumption.

The most bizarre aspect to all this is that the grower cops the consequences of the quality problem via the price received. Yet it is the retailer and the agents who have in the past resisted, indeed refused, improvements to reduce bruising damage. I suspect it will take considerable persuasion to get present retailers and agents to work with us to solve the bruising problem.

So to return to my original point. I was startled to read the Marketing Forum appeared to be thinking inside the box, ie seeking solutions inside *the present weight range*. I suggest there is strong evidence to support a major trial of a 12 kg carton with specific emphasis on reducing bruising of fruit.

Finally, you can be sure the response to this letter will be highly variable. Many will say it has been tried and failed OR it can't be done OR it's the wrong solution, etc. So I leave you with this thought: The problem is bruising, the consequences are extremely damaging to the industry, there is a solution proposed that looks feasible, so what more is needed to get action?

Keith Johnson  
Alstonville NSW



## TALKING AVOCADOS - HAVE YOUR SAY

Dear Sir;

I am writing in reference to the letter from "A Struggling Grower" in the March edition

of Talking Avocados.

Most growers, and I am sure our Struggling Grower does too, know the answer to the problem of fruit breakdown between picking and the consumer buying it. However, nobody wants to address it.

The solutions to some of the major reasons are:

1. Eliminate brushing, polishing and mechanical sorting. Why on earth anyone would bounce an easily bruised piece of fruit around in a fruit grader/polisher is beyond me. Why anyone would polish off a natural protective coating from a piece of fruit to make it look glossy is also beyond me. Can anyone explain why we persist with this stupid procedure?

2. Avocados do not like coolrooms. They hate them and they rapidly breakdown after removal.

3. Avocados will ripen naturally and in their own good time if placed in a warm place. Anyone who has tried to ripen a large number for a special order on a set date would know just how difficult it is to do. So what happens? The merchants force ripen them to suit god, sorry, the supermarket chains.

Now you know who is going to pay the long-term penalty for all the above? Yes it's us, the poor growers.

I cringe when I see some of the avocados on sale in supermarkets. I wonder if people really are stupid enough to buy them. I have a saying: "If a product meets the expectations of the person buying it, then you will get a sale. If it doesn't then you won't."

It's time we got back to basics.

*Ted Knoblock  
Coffs Harbour*

Dear Sir,

My thanks to Ted Knoblock for his response to my concerns on fruit quality. I cannot agree with his first point, re brushing and polishing. Research by Scott Ledger has shown that this does not harm freshly picked fruit and it certainly enhances the presentation at the retail outlet—in the old days we used to brush them and then wrap them in tissue paper.

I do, however, thoroughly agree with the second point, coldrooms. I believe this is the source of most of the problems. This resource, the coldroom, should be an asset for the agents and retailers by extending the shelf life of the product. Unfortunately,

the temperatures used do not generally conform to those recommended by the research done by QDPI.

The agents and particularly the retailers have many products to put in these rooms and most require different treatments and temperatures, a major problem for them and us. Additionally, the temperature variations by moving avocados from the coldroom to the shop for sale and then returning unsold fruit to the cold at night does tremendous damage.

Obviously, as said in your third point, the natural ripening is the best, which was what happened years ago when market floor cleared each week if not each day. Unfortunately, the production and the dominance of the supermarket prohibit it in the modern markets.

I have the same reaction when I see the condition of fruit in the markets, but no one has yet come up with a solution.

*Concerned,  
A Struggling Grower*

Dear Sir,

A letter from me that was published in both the Sydney Daily Telegraph and the Melbourne Herald Sun was reprinted in the March edition of TA.

A letter from Ms Astrid Kennedy, the Executive Officer of AAGF, was printed below it. That letter attacked the view that I attempted to convey to the consumer and I would like the opportunity to clarify a few points.

At no time, as claimed by Ms Kennedy, did I suggest that the consumer not buy avocados until mid April. I suggested they not buy small fruit until then.

If Ms Kennedy thinks that "professional growers and packhouses" only harvest and consign mature fruit early in the season then I think that she has been misinformed.

A packhouse from North Queensland had small-shriveled Shepard (28's) on sale in our local supermarkets at the end of February. I saw a consignment of Fuerte from one of our local "professional" growers on 6 March that contained trays of 25's. Neither could have possibly been mature.

Perhaps Ms Kennedy would like to accompany me to the southern markets next March to see just what immature fruit is being sold. I would be happy to point it out.

Growers who market immature fruit destroy markets for the honest ones. I will continue to warn the consumer of immature fruit each year. In the end we all might benefit!

*Ted Knoblock  
Coffs Harbour*

## WANTED

Volunteers are required from 5-14 August to attend the Brisbane EKKA and man the Avocado Stand for half a day.

In past years, the EKKA has been an important place to get the avocado message across to the public.

**Come support your industry.**

Inquiries: Larissa Meyer Ph 07 5478 9455

## Sunshine Coast Field Day

Sunshine Coast Avocado Growers' Association will be holding a Field Day and General Meeting on 9 June at the property of K. Smerdon, Lot 2, Old Gympie Road, Glass House Mountains.

A sausage sizzle will start the day rolling at 11.30 a.m. with the main event timed to start at 1.00 p.m.

Geoff Waite and Shaun Hood will give an update on Spotting Bug progress, there will be feedback on Tony Whiley's "Sunni" trials, Simon Newett will be discussing Orchard Floor Management focussing on mulching, and George Green will be showing how you can maximise returns from your farm.

If you intend to go, for catering purposes, RSVP by Monday 7 June to Larissa Meyer Ph 07 5478 9455, Fax 07 5479 9869.

## FOR SALE

**Complete Avocado Packing Line Suit small to medium sized operation**  
Unit comprises:

- Creep Feeder Hopper - 2 m
- Set of brushes complete with spray unit for post harvest spray application - 2m
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**This is a must for anyone packing fruit by hand.**

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# Industry Manager's say .....

By Wayne Prowse



Some darts have certainly been thrown at the New Zealand avocados this season and with some good reason. The quality through the season could only be described as ordinary deteriorating to atrocious at the

time of the new season Australian greenskins. The "poor" consumer—poor as in unknowingly buying poor produce and poor as in spending a few dollars on avocados that were never in a fit state to eat—is again confused about how to select avocados. As I have said many times before, our promotion effort without the right product (ie clean ripe flesh) is a waste.

There are, however, a few factors that need to be taken into consideration before we think that the issue is right through the industry for the rest of the year:

1. Extra volume of New Zealand produce could not command the premium.
2. Excess "aged" and "deteriorating" stock extended sales into the greenskin season.
3. Abnormal rainfall brought our crop on faster, and with fear of anthracnose prompting early harvesting.
4. Floods were hampering the transport of the north Queensland crop so that the fruit was close to ripe by the time it reached the markets.

In the end some marketers sustained losses in clearing and dumping unsaleable NZ Hass. The new season greenskin growers were caught in an unwinnable situation marketing fruit at the same time as the low "Clearance" priced NZ Hass, which was more likely to turn consumers away from the market.

On the whole, the quality has been much better since the beginning of April and according to our AHC merchandising team the quality picked up rapidly in late March as NZ fruit was cleared and hopefully consumers regained some confidence with Shepard and Fuerte.

### AC Nielsen "Homescan"

Last issue I introduced the "Homescan" data that we are now collecting through the

research company AC Nielsen. The data will be of most value after we have a full year of data (by July 1999); however we are already seeing a number of trends emerging. Rather than introduce too much data I will cover some aspects each issue. Where I am able to meet you at regional meetings I will of course be able to go into more detail.

### Penetration

The penetration measure helps us to understand how many households consume avocados in a given period. Expressed as a percentage of households the monthly penetration in six months to December for all Australia was:

July	15.0%
August	14.8%
September	15.4%
October	18.0%
November	16.1%
December	14.3%

This means that in October, 18% of all households purchased avocados. Further analysis and market intelligence show that as prices increased towards December (with reduced supplies) the lighter users dropped out of the market and only 14.3% purchased avocados.

### Cumulative Depth of Trial

The Penetration figures tell only part of the story. For example, we do not know whether the same people buy each month or a new set of people. The Cumulative Depth of trial helps us understand this as it takes into consideration who has purchased more than once. In the same six month period we found that the percentage of consumers who purchased at least once or more were:

At least once	35.6%
At least twice	24.0%
At least three times	17.7%
At least four times	13.8%
At least five times	10.3%
At least six times	7.8%

This means that over the six months avocados were purchased by 35.6% of households though only 7.8% of households purchased avocados at least six times (say monthly), and identifies the market opportunities we have.

Further analysis will break this down by state, introduce average weight of

purchase (volume bought each shopping trip - typically 2 avocados), prices paid etc.

The data will be invaluable as a marketing tool to help measure effectiveness of promotions, (compared with last year, other states, previous month etc.), as well as identify opportunities for long term market growth targets.

### Cooperative Promotions

With the emergence of larger marketing groups within the avocado industry there are more opportunities for cooperative promotions. Cooperative promotions involve at least two parties contributing funds and agreeing on strategies for promotions that benefit both parties.

Most growers are aware of the national promotions that we manage on behalf of the industry. The key criteria that we always refer to is that the promotion (in store, public relations, magazine advertising, etc) must be in the best interests of the whole industry. For this reason we spread the promotional dollar across the main production period (March to November) and markets being careful not to specifically advantage a particular area.

Our in store demonstrations for example use a core group of about 5 demonstrators in each state who move from store to store each week. I am sometimes asked as to why we do not conduct a "blitz" with a hundred demonstrations running each week for a short period. The answer is two-fold:

1. Logistics - to coordinate one hundred demonstrators for a few weeks would involve using people who may have been demonstrating dish washing liquid last week is not in the best interests of the avocado industry!
2. Equal share - as all growers pay the levy it would be contentious to give disproportionate advantage only to the growers who have marketed their avocados in the period of the promotion.

*(Having said this I realise that some levy paying growers market fruit in the period December to February. We deliberately avoid promotions at this time as the market is generally dominated by New Zealand fruit and using Australian levy funds to promote New Zealand avocados would also be contentious.)*



Cooperative promotions are where some of the levy funds are combined with other funds to conduct promotions of mutual benefit. In this case the promotion of avocados benefits the whole industry over the long term whilst the promotion of a "brand" benefits the marketing group. Over the years we have been involved in cooperative promotions. Most notably:

- WA - each year the Western Australian avocado growers have submitted a promotion proposal through their agency Fresh Finesse. We fund a significant part of the promotion, particularly those parts that relate to the national strategy, whilst the Western Australian growers fund the balance and benefit from a Western Australian focussed activity.
- SA - The South Australian growers have had a long association with Chiquita Brands who are the largest marketer of avocados in the state. Again each year we receive a proposal from Chiquita Brands who then add their own funds to extend the value of the promotion of avocados in South Australia.
- Woolworths - For the first time in 1998 we contributed funds for a national Woolworths promotion that involved

avocados, fresh cut salads and a salad dressing. Since our demonstrations introduce avocados to consumers in usage situations, participating in this activity extended the reach of the promotion to more than twice the number of stores that we could reach for the same money.

The marketing forum has agreed that we should pursue more cooperative promotion activities in 1999/2000 where there are joint opportunities to both promote the benefits of avocados to consumers and the benefits of the region, marketing group or complimentary products.

## Your Levy at Work April to June

### In store demonstrations

The March to June program has a focus on introducing consumers to greenskin avocados with particular emphasis on the difference in not turning dark like Hass. Approx 40 demonstrations are planned nationally in this period.

### Public Relations

- Avocado - Good News from the Heart - prepared by nutritionist Catherine Saxelby for "Heart Week" in early May.

- Variety - the spice of life - focussed on a range of varieties of avocados including Fuerte, Reed, Wurtz and Hass.

The first half releases generated \$236,000 in publicity value that is the best we have ever achieved. Let's hope that the results are on the same track in the second half.

### Advertising

- Baby Care and Pregnancy Book annuals were printed in April carrying revised avocado advertising and information relevant to pregnant woman and new mothers.
- Young Women's magazines - 8 ads across various titles including New Woman, Better Homes and Gardens, Cosmopolitan and Who Weekly.

### Merchandising

Merchandising Cycle 2 was completed 30 March with 600 store visits and information flowing to store managers and back to industry. During this cycle we "CUT" avocados with the managers to demonstrate the effects of bruising. In some very bad cases we cut whole trays of rotten avocados (ex NZ) that lead to the store managers taking the whole display away.

## Export Growth

By Fiona Douglas, Marketplace News, April 1999

The gross value production of horticulture in 1996-97 was \$4.7 billion, ranking it third behind the grains and meat industries.

Horticulture employs some 80,000 people in the production side, 11,200 in fruit and vegetable processing and total exports of horticulture accounted for \$1.6 billion in 1997-98.

These statistics were presented at the recent Outlook 99 Australian Bureau of Agriculture and Resource Economics (ABARE) Commodities Forecasting Conference by Agriculture, Fisheries and Forestry Parliamentary Secretary, Senator Judith Troeth.

"Horticulture is truly the growth industry in agriculture," she said.

And there still remains ample potential for the industry to expand into export markets.

"Across all agriculture 80% of production is exported. While horticulture

collectively is the third largest agricultural industry, only 25% of its production is exported. We need to encourage horticulture to grow further into potential export markets if industry growth is to be sustained and to do this we need to look at the critical issues facing horticulture," Senator Troeth said.

"Some of the approaches that need to be taken include a focus on 'sunrise' products, increasing production size, pooling resources within the industry or investing more in value adding. Improved transport and communications technology has enabled the agriculture sector to expand into global markets.

"The industry is no longer State or nationally based but multi national. The development of supply chains provides the necessary networks in the industry to be more competitive on a global scale."

The horticulture industry needs to accept change, part of which will mean confronting the issue of biotechnology.

Sustainability of natural resources is another challenge and having ready access to water supply is a critical issue. Senator Troeth said there is an expansion of horticulture into traditional sheep and cattle regions, like Hillston in western NSW, because of the availability of underground water.

"We have seen a 300% increase in water licences in that area over the past two years and the NSW Government has now moved to place a moratorium on any new licence applications. While this expansion is occurring, considerable care still needs to be taken to ensure that environmental problems that exist in other irrigated areas are not repeated in this new region," Senator Troeth said.

## Farmers Become Computer Buffs

*From the Tasmanian Advocate*

More than one in three farmers use computers, according to the Australian Bureau of Agricultural and Resource Economics' Australian Farm Surveys Report.

ABARE executive director Dr Stephen Beare said the use of computers on broadacre and dairy farms had more than doubled since 1993-94.

Most users kept track of income and cost details and managed their accounts using the technology.

Dr Beare said computers were used in planning matters by more than two in three farmers and, in many cases, had helped crop and livestock management.

"Use of computers in cropping industries outstripped use in other industries," he said.

"Buying and selling via the Internet are still in their infancy. In 1996-97, more use of modems was

made to obtain information via the Internet than for buying or selling." According to the ABARE report, the main reason farmers did not use computers was a lack of technical familiarity.

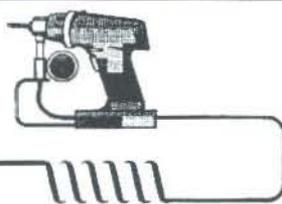
Almost as many said a computer would not be useful.

The majority of users were younger members of the farm work force and those with at least five years of secondary schooling.

"Farmers in areas closest to capital cities—the high rainfall zones—made less use of computers than farmers in the wheat/sheep or pastoral zones," Dr Beare said. Telephone costs and problems had limited the use of modems.

"If these were less of a problem, it is likely that use would increase, especially in the more remote areas."

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## Beware Genetically Modified Food Backlash

*These article on genetics are by Fiona Douglas, National Marketplace News, April 1999*

In the months to come growers can expect more and more genetically modified products to become available. Genetically modified (GMO) varieties might not be identified as such, so it would pay to enquire in detail about the genetic status of all new varieties you are planning to grow.

The reason I raise this topic again is because consumer backlash to genetically modified foods in Japan, the UK and Europe is on the increase. For growers the immediate issue is not whether GMO food is safe or not; the issue for growers is "if the consumer doesn't want it, there is no market".

An example of consumer rejection of GMO foods was shown on ABC television's Lateline recently. It was revealed that 90% of UK food retailers (with the exception at this stage of Tesco) have vowed to their customers that they will not use any genetically modified foods or ingredients in their home brand lines.

The UK retailers are responding to consumer fears, and TV campaigns fuel these fears, of "mutant foods". Similar consumer campaigns are in place in Japan and Europe.

This matters to Australian producers for two reasons. First, if these countries are potential export markets, we need to be aware

that genetically modified produce may well be unacceptable. Second, this consumer backlash is likely a forerunner to what will take place in Australia; expect Australian consumers to behave similarly in the not too distant future. Growers will then be facing domestic and international markets that are 'GMO aware'.

As it stands the debate in Australia tends to be restricted to a scientific level, where scientists from both sides are arguing the toss. But it is consumers—the marketplace—that will decide the outcome and, from overseas evidence, the verdict at this stage appears to be a thumbs down.

Naturally opportunity will arise as the marketplace rewards those that listen. Australian producers could do well to investigate non-GMO buyers (lots of them in the UK!) and take advantage of a market opening.

As a final thought, when inquiring about the genetic status of a new variety, growers should be sure to extract a complete answer. Be aware that there is a term used in biotech circles called 'substantial equivalence'. This means that a plant variety can have been genetically manipulated, but provided this was not too radical (unlike fish genes into strawberries or human

genes to pigs) it can be deemed 'substantially equivalent' to the original plant.

Some varieties, therefore, may not be identified as GMO if their makers considered them to be substantially equivalent. But for most consumers rejecting GMO foods, the substantial equivalence argument does not hold—it will be rejected like its more radical counterparts. Hence, check new varieties thoroughly before growing so you won't have any unpleasant surprises come market time.

### Genetically Modified Foods - The Clock Is Ticking

THE Australia New Zealand Food Authority (ANZFA) is concerned that despite widespread debate and media coverage of the requirements for genetically modified foods to undergo a safety evaluation, only a small number of applications have been received.

During the past seven months, ANZFA has gone to considerable lengths to inform the food industry of regulatory changes regarding genetically modified foods. Despite this, a number of products are unlikely to comply with the new regulations by the deadline of 13 May, 1999.

The Australia New Zealand Food Standards Council adopted a new standard on 30 July 1998 requiring all genetically modified food to be officially approved, with ANZFA first evaluating their safety for human consumption. ANZFA has consistently drawn attention to the need for applications to be lodged early to allow decisions to be made by the deadline of 13 May, 1999.

Producers of many of genetically modified organisms (mostly produced overseas) have not lodged an application for regulatory approval.

If nothing is done to address this situation prior to 13 May 1999, the companies responsible for these products will have to withdraw their products from the market or risk regulatory action by the relevant enforcement authorities.

## Facts On Gene Technology

AUSTRALIANS are sending a strong message that they want more information about gene technology and food, according to a national survey conducted by the CSIRO.

New research into consumer attitudes suggests most Australians are willing to try gene-modified foods provided they can see clear benefits.

"But the overwhelming message from this sample of opinion was that people don't have enough information on gene technology or its use in food, and they would definitely like more," CSIRO human nutrition principal research scientist Dr Katrine Baghurst said.

Dr Baghurst outlined the findings of the national random survey to a conference on gene technology hosted by the Australian Academy of Science at the Maritime

Museum in Sydney in late March. The results are based on 623 postal responses.

"The survey shows 47% of respondents would be willing to try genetically modified foods, if they are of better quality and the same cost as ordinary foods, while 17% said they were unwilling to try it

But more than half of respondents (58%) claimed they knew little or nothing about gene technology and its use in the food chain although most had heard vaguely about it.

"A key finding of this survey was that 81% of respondents see a clear need for ongoing communication of information to the public about gene technology."

Dr Baghurst said it is interesting that this survey suggests most consumers still rate the issue of chemicals in the food chain as a much greater concern.

# Australian Round-up



## Sunshine Coast

The Annual General Meeting of SCAGA, held in March this year, was one of the best-attended AGM's in many years. This is always a very encouraging indicator for

the officers and executives when growers show an interest in their industry and there is no better way of showing it than by participating in industry events, activities and meetings.

We all know that the sighting of a single swallow does not necessarily mean that summer has arrived, we are nevertheless hopeful that this is the beginning of a healthy trend for increased grower participation in this dynamic and exciting industry.

The SCAGA constitution has a sunset clause which basically prevents officers holding any one position for longer than three years. As a result of this, a new president, secretary and treasurer were elected. There are also two new faces on the executive. Fortunately three members of the previous executive were also re-elected which means that there will be some continuity. The new officers are:

President	Walter Meyer
Vice President	Ian Goodall
Secretary	Larissa Meyer
Treasurer	Kerry Smerdon
Executive	Ken Webb
	Barry Back
	Iliia Starkovsky
	Ursula Starkovsky

It is perhaps opportune at this point to thank the vacating office holders and members of the executive for the many sacrifices they would have had to make over the many years while they were involved in SCAGA. They have given their time so unselfishly in serving both you the grower and the industry as a whole. May you all enjoy having your time back and do what you enjoy most - growing Avocados.

The new President, officers and members of the executive have received numerous offers of support and encouragement from various industry groups, the QDPI and from the AAGF to single out two. These were most welcome and greatly appreciated and I am sure that the offers of support will be called upon in the not too distant future.

At the business end, many growers are up on their picking ladders and cherry pickers and reports of a better crop than last year are coming in. Despite the very intense spotting bug pressure and wetter than expected rainy season, the crop appears to be an improvement on last year in both quantity and quality.

Market prices for green skins, however, are still a major concern. Many growers believe that consumer education and a concerted marketing push will go a long way in addressing this recurring problem. On a positive note, demand for Hass remains strong, which helps to keep the prices high. Those growers with Hass trees can look forward to a profitable season.

A Field Day and Quarterly General Meeting will be held on Wednesday 9 June, at K. Smerdon's property, Lot 2, Old Gympie Road, Glasshouse Mountains. The Field day will discuss trials of 'Sunni', give an update on the Spotting Bug project and cover Orchard Floor Management.

The Field Day will kick off with a sausage sizzle at 11.30 a.m. and the avocado business will start at 1.00 p.m. For further information, telephone Larissa Meyer on 07 5478 9455.

## Bundaberg

The district's harvest will be approaching the midway point for the season. Unfortunately early season green skin prices were disappointing, mainly due to the volume of Shepard in the market this year and the poor quality of New Zealand Hass.

Predictably, anthracnose breakdown has been a problem, after a damp spring.

Ironically, water is still the issue for this district even after a damp spring. Parts of the district have had less than 350 mm to the end of April this year. Monduran dam has only gained 12% from its start of 3% of capacity. Several hail storms, the last as recently as 1 May, have caused some damage around the district.

Fruit Spotting Bugs have been very active this season, reminding us of the importance of Endosulfan in our armoury.

Hass fruit has sized up very well this season, due mainly to the cool nights in September and October. Even taking the above into consideration, this year's crop from the district is likely to be up by about 30% on last year.



The NSW harvest is in full swing with Fuerte and Sharwil being picked. Prices have been quite disappointing in comparison with last year. Factors influencing this appear to be:

• A larger Shepard crop impinging on the traditional Fuerte market.

• A loss of consumer confidence following the presence of NZ Hass in the market place that were well past their "use-by-date".

Generally, growers' returns have been further reduced by higher than average rejects and seconds in their crop, mainly caused by lengthy spells of wet weather leading up to harvest. These conditions have promoted pest and fungal attacks and at the same time limited the grower's ability to maintain an effective spray program.

Friday 14 May saw the holding of a very successful Field Day/Dinner organised by the Richmond and Brunswick Branches.

Over 80 people attended the morning session where guest speakers, Ian Toerien, Dr Jonathan Cutting, John Dirou, Peter Williams and Graeme Sait gave an interesting and informative series of talks around the theme of nutrition.

In the afternoon we visited Alan and Gina Hartley's property and in particular, saw first hand the canopy management principles being employed by Alan.

I came away resolved to finally do something with my own "feral" trees.

Dinner that evening was at the Ballina RSL Club. Some 55 people attended and it was a great success. Jonathan Cutting gave an interesting and entertaining after dinner speech.

Special mention and congratulation must go to the committee that organised the events—thanks Warren Everingham, Barry Daley and Peter Molenaar for a job well done.

Again John Dirou's assistance to the committee was invaluable—well done John.

In recent memory it has been the Coffs Harbour Branch receiving the accolades for outstanding performances in bringing their various functions together. Now northern Branches have shown their mettle.

Your move Coffs Harbour!

## Chemicals Registered For The Avocado Industry

It has come to the attention of the R, D & E Committee that there are a number of products used legally by Australia avocado growers in the past, which are now not registered. The most obvious example of this is the product Dichlorvos. Originally registered as an additive to Chlorpyrifos for the control of Ivy leaf roller, Dichlorvos was formulated as a product with 500 g/L of active ingredient (ai). It is no longer available in that formulation and is now formulated with 1140g /L ai. This formulation is not only unregistered, but over twice the concentration of the original registered product.

As a service to the Avocado Industry, we have been able to get the Centre for Pesticide Application and Safety at the University of Queensland, Gatton College, to supply us with a list of registered insecticides and fungicides from their Peskem data base. This list is up to date as of 5 May 1999.

The most critical factor in pesticide usage is that the label on the product is the legal document. Regardless of any information in any existing publications, details on that label are the directions that need to be followed. If "Avocados" are not on the label, it is not legal to use

that product on your avocado crop. It is also only legal to use that product in the manner as described on that label.

Off-label permits are available for various pests. These permits are generally a temporary measure until a registration can be obtained. Details of these permits are generally available from your local Department of Primary Industries or Agriculture Department.

This article on chemicals is designed as a lift out and can be removed from the magazine. Keep it as a ready reckoner for use in pesticide management.

### Avocado Pests and Treatments

PEST	ACTIVE CONSTITUENT	COMPANY	TRADE NAME	APPLICATION RATE /100L	/HECTARE	SCHEDULE	WD	STATE/ TERRITORY <sup>1</sup>	CRIT KEY <sup>2</sup>	
AVOCADO LEAFROLLER	CHLORPYRIFOS	BARRAC	CHLORPYRIFOS	50-100 mL	1.0-2.0 L		07	QR	73729	
		DAVISON	CHLORPYRIFOS 500 EC	50-100 mL	1.0-2.0 L		07	Q	73729	
		DAVISON	CHLORPYRIFOS 500EC L	50-100 mL			07	Q	73729	
		DOW	LORSBAN- 500 EC	50-100 mL	1.0-2.0 L		07	QR	73729	
		RHONE-POUL	CHLORFOS*	50-100 mL	1.0-2.0 L		07	Q	73729	
		SANONDA	BAR 500EC	50-100 mL	1.0-2.0 L		07	Q	73729	
BANANA-SPOTTING BUG	ENDOSULFAN	AGREVO	THIODAN* EC	150 mL	-	2-3 WEEKS	14	NVQSWTRC	73223	
	METHIDATHION	NOVARTIS	SUPRACIDE- 400	125 mL	-	7-10 DAYS	07	Q	75032	
	ENDOSULFAN	NUFARM	ENDOSULFAN 350 EC	150 mL	-	10-14 DAYS	14	NVQSWRC	44266	
FIORINLA SCALE	CHLORPYRIFOS	DAVISON	CHLORPYRIFOS 500 EC	100 mL	-	AS NEEDED	07	Q	76019	
		DAVISON	CHLORPYRIFOS 500EC L	100 mL	-	AS NEEDED	07	Q	76019	
		RHONE-POUL	CHLORFOS**	100 mL	-	AS REQUIRED	07	Q	76019	
FRUIT FLIES	FENTHION	BAYER	LEBAYCID*	75 mL	-	DIP 1 MINUTE	-	NQ	73934	
		BAYER	LEBAYCID*	75 mL	-		07	NVQRC	63711	
		BAYER	LEBAYCID* 10C	4 mL/L	-		07	NVQW	76579	
FRUIT SPOTTING BUG	ENDOSULFAN	AGREVO	THIODAN* EC	150 mL	-	2-3 WEEKS	14	NVQSWTRC	73223	
	TRICHLORFON	BAYER	DIPTEREX* 500SL	200 mL	-	FIRST SEEN	02	QR	72806	
	ENDOSULFAN	MAKHTESHIM	THIONEX 350 EC	150 mL	-	10-14 DAYS	14	NVQSWTRC	44266	
	METHIDATHION	NOVARTIS	SUPRACIDE** 400	125 mL	-	7-10 DAYS	07	Q	75032	
	ENDOSULFAN	NUFARM	ENDOSULFAN 350 EC	150 mL	-	10-14 DAYS	14	NVQSWTRC	44266	
HAIRY CATERPILLARS	CHLORPYRIFOS	TRICHLORFON	NUFARM	LEPIDEX* 500	210 mL	-	FIRST SEEN	02	Q	42879
		BARMAC	CHLORPYRIFOS	50-100 mL	1.0-2.0 L	FIRST SIGN	07	NC	73731	
		DAVISON	CHLORPYRIFOS 500 EC	50-100 mL	1.0-2.0 L	AS NEEDED	07	N	76018	
		DAVISON	CHLORPYRIFOS 500 EC L	50-100 mL		AS NEEDED	07	N	76018	
		DOW	LORSBAN* 500 EC	50-100 mL	1.0-2.0 L	FIRST SIGN	07	NC	73731	
		RHONE-POUL	CHLORFOS*	-	1.0-2.0 L	AS NECESSARY	07	N	76018	
		SANONDA	BAR 500EC	50-100 mL	1.0-2.0 L	AS NEEDED	07	NC	73731	
		BARMAC	CHLORPYRIFOS	50-100 mL	1.0-2.0 L	FIRST SIGN	07	QR	73729	
		BARMAC	CHLORPYRIFOS	50-100 mL		FIRST SIGN	07	NC	73730	
IVY LEAFROLLER	CHLORPYRIFOS	DAVISON	CHLORPYRIFOS 500 EC	50-100 mL	1.0-2.0 L	FIRST SIGN	07	Q	73729	
		DAVISON	CHLORPYRIFOS 500 EC	50-100 mL		FIRST SIGN	07	N	73730	
		DAVISON	CHLORPYRIFOS 500EC L	50-100 mL		FIRST SIGN	07	Q	73729	
		DAVISON	CHLORPYRIFOS 500EC L	50-100 mL		FIRST SIGN	07	N	73730	
		DOW	LORSBAN* 500 EC	50-100 mL	1.0-2.0 L	FIRST SIGN	07	QR	73729	
		DOW	LORSBAN* 500 EC	50-100 mL		FIRST SIGN	07	NC	73730	
		RHONE-POUL	CHLORFOS*	-	1.0-2.0 L	FIRST SIGN	07	N	76208	
		RHONE-POUL	CHLORFOS*	50-100 mL		FIRST SIGN	07	Q	73729	
		SANONDA	BAR 500EC	50-100 mL	1.0-2.0 L	FIRST SIGN	07	QR	73729	
		SANONDA	BAR 500EC	50-100 mL		FIRST SIGN	07	NC	73730	
		BARMAC	CHLORPYRIFOS	50-100 mL	1.0-2.0 L	AS NEEDED	07	NC	73731	
		DAVISON	CHLORPYRIFOS 500 EC	100 mL	-	AS NEEDED	07	Q	76019	
		DAVISON	CHLORPYRIFOS 500 EC	50-100 mL	1.0-2.0 L	AS NEEDED	07	N	76018	
		DAVISON	CHLORPYRIFOS 500EC L	100 mL	-	AS NEEDED	07	Q	76019	
		DAVISON	CHLORPYRIFOS 500EC L	50-100 mL	1.0-2.0 L	AS NEEDED	07	N	76018	
LATANIA SCALE	CHLORPYRIFOS	DOW	LORSBAN* 500 EC	50-100 mL	1.0-2.0 L	AS NEEDED	07	NC	73731	
		DOW	LORSBAN* 500 EC	50-100 mL		AS NEEDED	07	NC	73730	
		RHONE-POUL	CHLORFOS*	-	1.0-2.0 L	AS NECESSARY	07	N	76018	
		METHIDATHION	NOVARTIS	SUPRACIDE* 400	125 mL	-	AS NEEDED	07	Q	75033
		CHLORPYRIFOS	RHONE-POUL	CHLORFOS*	-	1.0-2.0 L	AS NECESSARY	07	N	76018

<sup>1</sup> N=NSW, V=VIC, Q=QLD, S=SA, W=WA, T=TAS, R=NT, C=ACT

PEST	ACTIVE CONSTITUENT	COMPANY	TRADE	APPLICATION RATE /100L /HECTARE	SCHEDULE	WD	STATE/ TERRITORY <sup>1</sup>	CRIT KEY <sup>2</sup>	
LIGHT BROWN APPLE MOTH	CHLORPYRIFOS	RHONE-POUL	CHLORFOS*	100 mL -	AS REQUIRED	07	Q	76019	
		SANONDA	BAR 500EC	50-100 mL 1.0-2.0 L	AS NEEDED	07	NC	73731	
		BARMAC	CHLORPYRIFOS	50-100 mL 1.0-2.0 L	AS NEEDED	07	NC	73731	
		DAVISON	CHLORPYRIFOS 500 EC	50-100 mL 1.0-2.0 L	AS NEEDED	07	N	76018	
		DAVISON	CHLORPYRIFOS 500EC L	50-100 mL	AS NEEDED	07	N	76018	
		DOW	LORSBAN* 500 EC	50-100 mL 1.0-2.0 L	AS NEEDED	07	NC	73731	
MEDITERRANEAN FRUIT FLY	DIMETHOATE	RHONE-POUL	CHLORFOS*	1.0-2.0 L	AS NECESSARY	07	N	76018	
		SANONDA	BAR 500EC	50-100 mL 1.0-2.0 L	AS NEEDED	07	NC	73731	
		ROTAM	ROMETHOATE*	100 mL	DIP FRUIT	QUARANTINE	-	NQRC	76541
		BARMAC	CHLORPYRIFOS	50-100 mL 1.0-2.0 L	AS NEEDED	07	NC	73731	
		BAYER	DIPTEREX* 500SL	200 mL -	FIRST SEEN	02	QR	72806	
		DAVISON	CHLORPYRIFOS 500 EC	50-100 mL 1.0-2.0 L	AS NEEDED	07	N	76018	
MONOLEPTA BEETLE	CHLORPYRIFOS	DAVISON	CHLORPYRIFOS 500EC L	50-100 mL	AS NEEDED	07	N	76018	
		DOW	LORSBAN* 500 EC	50-100 mL 1.0-2.0 L	AS NEEDED	07	NC	73731	
		NOVARTIS	SUPRACIDE* 400	125 mL -	7-10 DAYS	07	Q	75032	
		NUFARM	LEPIDEX* 500	210 mL -	FIRST SEEN	02	Q	42879	
		RHONE-POUL	BUGMASTER* FLOWABLE	200 mL	FIRST SIGN	03	NQTRC	74810	
		RHONE-POUL	CHLORFOS*	1.0-2.0 L	AS NECESSARY	07	N	76018	
QUEENSLAND FRUIT FLY	DIMETHOATE	SANONDA	BAR 500EC	50-100 mL 1.0-2.0 L	AS NEEDED	07	NC	73731	
		AGREVO	PERFEKTHION* EC 400	100 mL -	DIP 1 MINUTE-	-	NC	74074	
		AGREVO	PERFEKTHION* EC 400	75 mL	AS NEEDED	07	QR	11981	
		COLIN CAMP	PYRINEX* 500 WP	120 g/30 L +YEAST	ON TRUNK	07	NQ	75218	
		CROP CARE	SABOTEUR*	100 mL	DIP 1 MIN	QUARANTINE	-	QR	76541
		CROP CARE	SABOTEUR*	75 mL -	AS NEEDED	-	QR	11981	
CHLORPYRIFOS	DIMETHOATE	CYANAMID	ROXION* 400	75 mL -	AS NECESSARY	07	Q	57752	
		DAVISON	CHLORPYRIFOS 500 EC	400 mL +YEAST	LOW IN TREE	07	Q	76015	
		DAVISON	CHLORPYRIFOS 500EC L	400 mL	LOW IN TREE	07	Q	76015	
		DAVISON	DIMETHOATE 400EC	75 mL -	AS NEEDED	-	Q	11981	
		DOW	LORSBAN* 500W	120 g/30 L +YEAST	ON TRUNK	07	NQRC	75218	
		FARMOZ	STRIKE-OUT 250 WP	240 g/30 L +YEAST	ON TRUNK	07	NQRC	75218	
CHLORPYRIFOS	DIMETHOATE	NUFARM	DIMETHOATE	75 mL	AS INDICATES	07	QR	74826	
		RHONE-POUL	CHLORFOS*	400 mL +YEAST	ON TRUNK	07	Q	76209	
		ROTAM	ROMETHOATE*	100 mL	DIP FRUIT	QUARANTINE	-	NQRC	76541
		ROTAM	ROMETHOATE*	75 mL -	AS INDICATES	07	QR	74826	
		NOVARTIS	SUPRACIDE* 400	125 mL -	AS NEEDED	07	Q	75033	
		AMPOL	D-C-TRON* PLUS	1.2-1.6 L -	AS NEEDED	01	Q	75719	
RED-BANDED THRIPS	PETROLEUM OIL	AMPOL	D-C-TRON* PLUS	2.0 L	AS NEEDED	01	NW	75719	
		AMPOL	SUMMER SPRAY OIL	1.2-1.6 L	AS NEEDED	01	Q	75719	
		AMPOL	SUMMER SPRAY OIL	2.0 L	AS NEEDED	01	NW	75719	
		CYANAMID	TORQUE'	38 mL -	SPOT SPRAY	14	NQC	76703	
		CYANAMID	TORQUE'	38 mL -	SPOT SPRAY	14	NQC	76703	
		AGREVO	THIODAN* EC	150 mL -	2-3 WEEKS	14	NVQSWTRC	73223	
NUFARM	ENDOSULFAN 350 EC	150 mL -	10-14 DAYS	14	NVQSWRC	44266			

<sup>2</sup> KEY	CHEMICAL USE	KEY	CHEMICAL USE
11981	Apply as pest populations indicate.	75719	Apply when heavy scale populations occur on stems, foliage or fruit. DO NOT apply if trees need watering. Application is most effective against young crawler stages.
42879	Apply when pests are first seen.	76015	Mix 400 mL product with 2L Yeast Autolysate per 100 L water. Apply 15-30 L of spray mixture/ha (50-100 mL per tree) as a strip or patch low in tree every 7 days. AVOID CONTACT WITH FRUIT.
44266	Apply 1 or 2 sprays at 10-14 days interval when infestation is present.	76018	Apply and repeat as necessary. Spot spray affected trees only. Use higher rate during severe infestations.
57752	Apply as pest populations indicate.	76019	Apply as a quick-acting cleanup spray, particularly during bad infestations.
63711	Thorough spray coverage of fruit is essential.	76208	Apply at first sign of pest activity before larvae move to fruit. Use higher rate during severe infestations.
72806	Spray when pests are first seen and repeat if necessary.	76209	Apply 15 to 30 L of spray mixture/ha (50 to 100 mL/tree) as a strip or patch low in the tree every 7 days. Avoid contact with fruit.
73223	Apply one or two sprays at 2-3 week intervals when pest present.	76541	DIPPING: Immerse product in emulsion for 1 minute or according to the requirements of the importing State or Country. TOPPING UP (400 ppm dimethoate emulsion only): Top up with a separately prepared 400 ppm (100 mL/100 L) emulsion. REINFORCEMENT: (400 ppm dimethoate emulsion only): After each week, add 3 mL of product/100 L of dip emulsion. NOTE: (1) Refer also to Refnote R6/Feb 83 (Agdex 201/681) - "FRUIT AND VEGETABLES - stability of dimethoate in dips". (2) 400 ppm is the dip concentration required for fruit fly susceptible produce destined for interstate markets. For other destinations, the requirements may differ.
73729	For low volume spray equipment use the L/ha rate. Apply at first sign of pest activity before larvae move to the fruit. Use higher rate when under heavy pest pressure.	76703	Apply at the first sign of mite activity and repeat as infestations indicate. Spot spray individual trees only. Two applications a fortnight apart is normally adequate to control these pests.
73730	Apply at first sign of pest activity before larvae move to the fruit. Use higher rate when populations are high. For low volume spray equipment use L/ha rate.		
73731	Apply when populations indicate treatment is required. Spot spray affected trees only. Repeat as necessary. Use higher rate when populations are high.		
73934	Post harvest treatment - no withholding period. Dip fruit and completely submerge for 1 minute. Drain and allow to air dry.		
74074	Dip the fruit for 1 minute and allow to drain before packing.		
74810	Apply when infestation is first observed and repeat as swarms re-infest.		
74826	Apply as pest populations indicate.		
75032	Spray when pests are active. Repeat applications at 7-10 day intervals.		
75033	Spray thoroughly as required.		
75218	Use 50 to 100 mL of mixture/tree as a strip or patch low on the tree every seven days. AVOID CONTACT WITH FRUIT.		

## Avocado Diseases and Treatments

PEST	ACTIVE CONSTITUENT	COMPANY	TRADE	APPLICATION RATE /100L /HECTARE	SCHEDULE	WD	STATE/ TERRITORY <sup>1</sup>	CRIT KEY <sup>2</sup>
ANTHRACNOSE	COPPER AS HYDROXID	AGREVO	COPPER FUNGICIDE	200 g	-	14 DAYS	01 NVQSWRC	69860
	COPPER AS OXYCHLOR	AGREVO	OXYDUL*	400 g	-	2-4 WEEKS	01 NVQ	35242
	PROCHLORAZ	AGREVO	SPORTAK*	55 mL	-	NOT 'RINCON'	- NQWR	63766
	COPPER AS OXIDE	AGRICHEM	FLO-BORDO	2.0 L	-	EACH 30 DAYS	01 NVQSW	77048
	COPPER AS OXYCHLOR	BARMAC	COPPER OXYCHLORIDE	400 g	-	2-4 WEEKS	01 NQ	35242
	COPPER AS HYDROXID	BRYCE	BLUE-SIDE COPPER	200 g	-	14 DAYS	01 NVQSW	74359
	COPPER AS OXIDE	BRYCE	NORDOX*	200 g	3.0 kg	14 DAYS	01 NVQSW	74359
	PROCHLORAZ	COLIN CAMP	PROTAK 450EC	55 mL	-	NOT 'RINCON'	- NQWR	63766
	COPPER AS OXYCHLOR	CROP CARE	CUPROX*	400 g	-	14-28 DAYS	01 NVQ	73098
	COPPER AS HYDROXID	CYANAMID	KOCIDE*	200 g	-	14 DAYS	01 NVQSW	69860
		CYANAMID	KOCIDE* DF	200 g	-	14 DAYS	01 NVQSW	69860
		FARMOZ	COPPER HYDROXIDE 500	200 g	-	MONTHLY	01 NQS	74359
	COPPER AS OXYCHLOR	FARMOZ	COPPURITE	400 g	-	2-4 WEEKS	01 NVQ	35242
		GARD KING	COPPER SPRAY	4 g/L	-	14-28 DAYS	01 NVC	16665
	PROCHLORAZ	MAKETESHIM	MIRAGE	55 mL	-	NOT 'RINCON'	- NQ	63766
	COPPER AS HYDROXID	MULTICROP	KOCIDE* DF	10 g/5 L	-	14 DAYS	01 NVQSWRC	69860
		NUFARM	CHAMPION* WP	200 g	-	14 DAYS	01 NVQSW	74359
	COPPER AS OXYCHLOR	NUFARM	COPPER OXYCHLORIDE	400 g	-	14-28 DAYS	01 NVQ	73098
COPPER AS HYDROXID	YATES	FUNGUS FIGHTER	2 g/L	-	EACH 4 WEEKS	01 NVQSWTRC	77210	
PHOSPHOROUS ACID	FARMOZ	PHOS ACID 200	-	-	INJECT STEM	- NVQSW	75569	
COLLAR ROT								
PHYTOPHTHORA/ STEM CANKER	COPPER AS HYDROXID	AGREVO	COPPER FUNGICIDE	100 g/L WATER		PAINT STEMS	- NQRC	57823
ROOT ROT	PHOSPHOROUS ACID	AGRICHEM	AGRI-FOS	-	5.0-6.0 L	FOLIAR	- NVQSW	76812
		AGRICHEM	AGRI-FOS	7.5-15 mL/1 m CANOPY		INJECT TRUNK	- NVQSW	76004
		AGRICHEM	AGRI-FOS SUPA 400	-	5.0-6.0 L	FOLIAR	- NVQSW	76812
		AGRICHEM	ARRI-FOS SUPA 400	3.7-5.0 mL/m CANOPY		INJECT TRUNK	- NVQSW	76004
		NOVARTIS	PHOSPHOROUS ACID	15 mL/m CANOPY		INJECT TREE	- NVQSW	73588
	METALAXYL	NOVARTIS	RIDOMIL* 50G	100 g/m <sup>2</sup>		REPLANTING	- NQSW	50825
		NOVARTIS	RIDOMIL* 50G	100 g/m <sup>2</sup>		CURATIVE	07 NQSW	50826
		NOVARTIS	RIDOMIL* 50G	1 kg/m <sup>3</sup> SOIL		POTTED TREES	- NQSW	50827
		NOVARTIS	RIDOMIL* 50G	25-50G/m <sup>2</sup>		PROTECTIVE	- NQSW	50830
	METALAXYL-M	NOVARTIS	RIDOMIL* GOLD 25G	100 g/m <sup>2</sup>		REPLANTING	- NQSW	50825
		NOVARTIS	RIDOMIL* GOLD 25G	100 g/m <sup>2</sup>		CURATIVE	07 NQSW	50826
		NOVARTIS	RIDOMIL* GOLD 25G	1 kg/m <sup>3</sup> SOIL		POTTED TREES	- NQSW	50827
		NOVARTIS	RIDOMIL* GOLD 25G	25-50 g/m <sup>2</sup>		PROTECTIVE	- NQSW	50830
	FOSETYL-AL	RHONE-POUL	ALIETTE* WG	400 g	-	FOLIAR SPRAY	01 NVQSRC	11312
	PHOSPHOROUS ACID	RUTEC	FUNGI-FOS 400	-	5.0-6.0 L	FOLIAR	- NVQSW	76812
		RUTEC	FUNGI-FOS 400	3.7-5 mL/m CANOPY		INJECT TRUNK	- NVQSW	77054
		U I M	FOLI-R-FOS 200	7.5-15 mL/m CANOPY		INJECT TRUNK	- NVQSW	76004
		U I M	FOLI-R-FOS 400	5-7.5 mL/		INJECT TRUNK	- NVQSW	76004
		U I M	FOS-JECT 200	7.5-15 mL		INJECT TRUNK	- NVQSW	76004
STEM END ROT	PROCHLORAZ	AGREVO	SPORTAK*	55 mL	-	NOT 'RINCON'	- NQWR	63766
		COLIN CAMP	PROTAK 450EC	55 mL	-	NOT 'RINCON'	- NQWR	63766
		MAKHTESHIM	MIRAGE	55 mL	-	NOT 'RINCON'	- NQ	63766

<sup>2</sup> KEY	CHEMICAL USE	KEY	CHEMICAL USE
11312	For protection of trees not showing above ground symptoms of root rot. Apply 10-15 L per mature tree during the Spring flush and again at intervals of 6 weeks until Autumn. Apply lower volume to younger trees. Add a non-ionic wetting agent according to its label directions. Excessive use of wetting agent may result in some leaf burn.	50830	Use as a soil application at the beginning of summer wet season and repeat at 3 to 6 month intervals. Use the higher rate and more frequent treatments where the risk of infection is highest. Apply in alternative years only. Ensure weed growth is removed from under the tree and treat the entire area under the tree canopy.
16665	Apply from flowering to harvest, at 14-28 day intervals.	57823	Mix to a smooth consistency. Apply only to stems of trees wherever cankers appear, after removing dead tissue. Repeat applications up to a maximum of 5 per season until natural healing is commenced. Application with paint carrier may only require 1 or 2 treatments in a season.
35242	Apply at 4 weekly intervals from flowering to harvest. In prolonged wet weather reduce intervals to 2 weeks.	63766	Spray fruit for 30 seconds. Do NOT use on avocado cultivar Rincon.
50825	Apply at planting and repeat 8 to 12 weeks later. Incorporate into the soil by cultivation or watering. Do NOT use on unsterilised potting soil in avocado nurseries.	69860	Spray every 4 weeks from flowering to harvest. During extended wet periods, spray every 14 days. When using per hectare rate, apply not less than 300 L/ha.
50826	For established trees showing moderate to severe symptoms of decline. Apply as a soil application at beginning of summer wet season and again 8 to 12 weeks later, until trees have recovered. Clear all weed growth from under tree canopy. To ensure that the fungicide is carried into the root zone of the tree apply when rain is imminent or use irrigation.	73098	Apply from flowering to harvest, at 14-28 day intervals.
		73588	Inject trees in early spring and repeat treatment when spring flush has matured approximately 6 to 8 weeks later. Drill the holes (5 mm in diameter) about 25 to 50 mm deep into the tree at a 45 degree angle downwards. After absorption remove the syringe and seal the hole with a sealing compound such as putty or silicone.
50827	Potting soil should first be treated by using steam sterilisation procedures. Dry Soil Mix - after sterilisation and just before planting soil treatments, 8 to 12 weeks apart. Soil Treatment - if soil mix treatment has not been used at planting apply 3 times, 8 to 12 weeks apart. Wet the surface of the soil before applying the fungicide.	74359	Apply at monthly intervals from flowering to harvest (generally Sept to mid-April). During prolonged wet weather reduce intervals to 14 days.

- 75569 TRUNK INJECTION: Skeletal trees - 1st year 15 mL undiluted product per metre of canopy diameter. Other Situations: 7.5mL product diluted with 7.5 mL water per metre of canopy diameter. Inject trees at spring flush maturity and repeat application in February or March. Drill holes which are 5mm in diameter and 25 to 50 mm deep with a slight downward angle in the trunk. Syringes should be placed in the trunk at evenly spaced intervals around the circumference. The product is suitable for use with tree injectors, Ag-Muri gun or hydraulic tree injection. Do not prune back trees before injection process as burning of new growth may occur. Do not inject avocado trees in cold weather or winter months. Do not inject trees where the trunk is damaged e.g. sunburnt. Do not cut back the canopy of injected trees. Do not add any other material other than water to this product for tree injection. Do not inject more liquid in a lesser number of syringes than directed.
- 76004 Ideally inject trees between 6 a.m. and 11 a.m. when the transpiration rate is highest and hence uptake is faster. Drill holes 5mm in diameter and 2.5-5.0 cm deep with a slight downward angle in the trunk. Use one syringe for each 15 mL dose. Syringes should be evenly spaced around the circumference of the trunk. After absorption remove the syringe. It is not necessary to seal the hole as callusing will occur naturally. Thoroughly clean drill-bits and syringes between tree injections with sodium hypochlorite (1.5%), to prevent the spread of sunblotch viroid. Use the higher rate in 1st year and the lower rate as a preventative treatment.
- 76812 Solution concentration: 2.5-3.0 mL/L. Amount per unit: Spray to runoff - 7.5-10 L per adult tree. (1) For curative apply every 3 weeks until disease is under control. (2) For prevention apply every 5-6 weeks.
- 77048 Spray every 30 days from flowering to harvest. During extended wet periods, spray every 14 days.
- 77054 Inject trees at spring flush maturity - repeat treatment in February or March. Drill holes 5 mm in diameter and occur. Do not inject trees in winter months. Do not cut back the canopy of injected trees. Do not add any other material than water to the product by trunk injection. Do not inject more liquid in a lesser number of syringes than directed.
- 77210 Spray every 4 weeks from flowering to harvest. Inject trees at spring shoot maturity and repeat application during summer. Ideally inject trees between 6 a.m. and 11 a.m. when the transpiration rate is highest and hence uptake is faster. Drill holes 5mm in diameter and 2.5-5.0 cm deep with a slight downward angle in the trunk. Use one syringe for each 15 mL dose. Syringes should be placed in the main trunk of the tree and spaced evenly around the circumference of the trunk. Suitable for use with Chemjet tree injectors, Ag-Muri gun, or hydraulic tree injection. Do not prune back trees before injection process as burning of new growth may occur. Do not inject trees in winter months. Do not cut back the canopy of injected trees. Do not add any other material than water to the product by trunk injection. Do not inject more liquid in a lesser number of syringes than directed.

## Minor Use Office Opens Mid Year

*From NRA News, Volume 6, Number 2, March 1999*

A new industry-driven service that facilitates the approval of minor uses is expected to start in June this year.

Called the Office of Minor Use for Pesticides, it is a service that initially will work for vegetable grower organisations and their members.

Twice a year, eligible growers will be able to submit their minor use requirements to the office. According to team leader, Dr Peter Taylor, their wish list already contains 237 entries and is growing.

"What we'll do with the submissions is aggregate them and set priorities through an industry panel," Dr Taylor said.

"The submissions will be combined to create minor permit applications to the NRA that, if granted, can benefit the whole commodity group. Until now, growers have been applying separately for minor use permits.

"Through the office, we can provide a focal point that links the needs of growers with the NRA's permit system. Ultimately, it will see a

lot of minor uses approved and brought into the regulatory system."

Funded by the Horticultural Research and Development Corporation with levy funds from vegetable growers, the project builds on outcomes of the 1998 National Workshop on Minor Uses of Pesticides.

Interested readers will be able to follow developments in the project on the Internet at: <http://www.tsac.com.au/minorup/>

### Seminars On Minor Use And Permits

From April to November this year, the NRA will offer eight information seminars on minor use issues for growers, advisers and staff of government departments.

The seminar series, given by permits coordinator Alan Norden, provide a brief overview of the NRA and detailed sessions of:

- National permit System;
- Minor Use Program; and
- Office of Minor Use.

Mr Norden hopes that seminar attendees will gain a clear understanding of the NRA and how the permit system works. Growers will find out how to apply for a permit and what type of information is required.

Through the seminars, the NRA also hopes to learn more about the practical needs of growers and their commodity industries.

Seminars are still being arranged in conjunction with state departments of agriculture and will be publicised through state networks and future editions of NRA News.

Contact: Alan Norden, (02) 62 72 3 726.

## Fine For Illegal Chemicals

*By Fiona Douglas, Marketplace News, April 1999*

Brisbane company, Carter and Spencer International P/L, has been fined for importing Applaud, an unregistered agricultural chemical, and supplying it to citrus producers in southern Queensland.

The company was fined \$26,000 and a director was fined \$4,000 after pleading guilty in the Brisbane Magistrate's Court to offences of supply under the AgVet Code of Queensland, and offences of importation under the Commonwealth Agricultural and Veterinary Chemicals (Administration) Act 1992.

National Registration Authority for Agricultural and Veterinary Chemicals (NRA) quality assurance and compliance manager, Dr Joe Smith, said the fine was the largest to date for the unlawful importation and supply of an AgVet chemical product and the first successful prosecution by the NRA under the Administration Act.

In handing down his decision, Magistrate Williamson acknowledged the company's cooperation with investigating officers and noted that the penalty should act as a deterrent to others.

## World's Largest Guacamole Made In Mareeba

More than 5000 Shepard Avocados formed part of the world's largest guacamole dip made in Mareeba on 19 March 1999, according to Mr Don Lavers, a Shepard avocado grower and representative of Shepard Australia.

Mr Lavers said the guacamole dip weighed approximately one tonne and was created in a plastic tub the size of a small swimming pool.

"The aim of the event was to celebrate Primary Industries Week and to raise awareness of the Avocado industry, and in particular, the Shepard Avocado Industry, which produces the first avocado of the season," Mr Lavers said.

Two officials were on hand to monitor the progress of the dip and to ensure that everything was in order before making a formal submission to the Guinness Book of Records.

Mr Lavers said the event took place on the final day of Primary Industries Week and was a joint initiative between Shepard avocado growers and the Department of Primary Industries.

"The entire Mareeba Township supported the day, as did a number of growers and businesses who supplied 70 kilograms of onions, 80 kilograms of tomatoes and 50 litres of lime juice to make the dip.

"In North Queensland, more than one in four residents are involved either directly in primary industries, or in the service industries supporting the rural sector.

"It is important that the wider community is aware of the work and improvements undertaken by primary producers and the successful outcomes that have been achieved," Mr Lavers said.

The Shepard Avocado Industry in North Queensland is an excellent example of how a commitment by growers to improve

their product quality and implement training has benefited the industry.

"With strict quality procedures and controls, Shepard Australia has taken the 'guess work' out of buying a good quality avocado," Mr Lavers said.

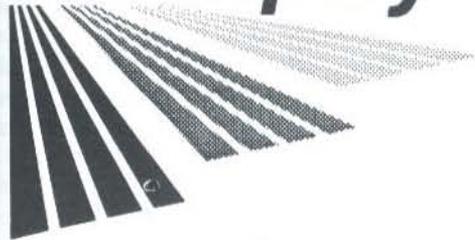
Twenty-six growers make up the Shepard Australia Cooperative which supplies Shepard Avocados from February to mid-May.

Mr Lavers said the Shepard Avocado was an ideal avocado choice for guacamole because, unlike other varieties, the Shepard Avocado flesh does not brown once cut.

"It was great to see hundreds of residents take part in the festivities. The dip not only tasted great but was also good for you.

"Avocados are in the Guinness Book of Records for being the most nutritious fruit," Mr Lavers said.

# Farmpay



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## Government Initiatives On Horticulture Budget Announcements

The Federal Government's 1999 Budget announced expenditure on projects that will have some ramifications on horticultural industries.

The following article reflects four announcements that may have some effect on avocado growers, if not directly, then indirectly.

This article is published for the enlightenment of readers and should not be mistaken for support of the government initiatives.

### Supermarket to Asia Strategy

The Federal Government is allocating \$23.7 million over the three years from 1999-2000 to continue and augment the Government's Supermarket to Asia (STA) Strategy.

The funding comprises \$4.8 million to support the STA Council and the work program undertaken by the Council's secretariat, \$9.2 million for the Food and Fibre Chains Program, \$6.6 million for the AQIS Technical Market Access Program and \$3.1 million for the New Industries Development Program.

#### Background

The Supermarket to Asia Strategy is a cornerstone of the Government's efforts to improve the competitiveness of Australia's food exports. The Strategy and the establishment of the Prime Minister's Supermarket to Asia Council recognises that the future expansion of Australia's food industry will depend largely on taking advantages of the opportunities in the growing markets of Asia.

These opportunities remain very large, especially over the medium to longer term.

The Council was established to bring together industry and government leaders to provide a through-chain approach to industry and government efforts to achieve a more competitive agri-food industry. The Council has commenced its task but high level leadership in Australia's agri-food industry remains critical if the industry is to prosper in today's rapidly changing international environment. Future competitiveness will increasingly depend on participation in global supply chains and servicing the needs of customers for consistency, quality, variety and volume. The STA Council is well placed to facilitate the build up of skills and knowledge necessary to survive in today's global market.

Through the 1999-2000 Budget the Government has committed funding for the following key elements of the STA Strategy:

- support for the Council and the work program undertaken through its secretariat, Supermarket to Asia Ltd;
- the new Food and Fibre Chains Program, to assist Australia's food and fibre industries build more competitive supply chains into export markets. The new

program will be managed by a subsidiary of STA Ltd;

- the Technical Market Access Program administered by the Australian Quarantine and Inspection Service will contribute to the achievement of market access goals under the Government's Supermarket to Asia Strategy by addressing technical impediments to access to agri-food markets in Asia; and,
- the New Industries Development Program, overseen by a New Industries Working Group in the STA Council, will facilitate new agricultural industry and product development.

#### Impact

The STA Council aims to boost Australia's food exports to Asia by strengthening the export culture within the Australian food industry, providing a helpful business environment, and developing our markets in Asia. Following the establishment and awareness raising stages of the Strategy, the Council has now strengthened the focus of its work program on directly driving improved export results.

### Technical Market Access Program

As part of its Supermarket to Asia Strategy, the Government announced the continued funding of \$6.6 million over the next three years for the Technical Market Access Program administered by the Australian Quarantine and Inspection Service (AQIS).

#### Background

The objective of the AQIS Technical Market Access Program is to contribute to the achievement of market access goals under the Government's Supermarket to Asia Strategy, through facilitating trade to the region by addressing technical impediments to access to agri-food markets in Asia.

The Program has received annual funding of \$2 million since July 1996. The additional funding has been used to establish technical specialist positions in Tokyo and Seoul as well as additional positions in Australia.

Maintaining existing markets threatened by various incidents within Australia is also an important component of the Program.

There have also been important market access gains resulting from the Program including apples to China and Japan, kangaroo, emu and ostrich meat to the Philippines, UHT milk to Korea, chilled pork to Singapore, live cattle to China and mandarins to Japan.

It is important that the Program be continued to build on its achievements so far.

A recent independent evaluation found that the Program has been effective in achieving its objectives and that there is overwhelming industry support for its continuation.

#### Impact

The Government's decision to continue funding the Technical Market Access Program will mean new, improved or faster access for exporters of a range of horticultural, livestock and game products. It will also mean maintaining existing access for products that may be threatened by food safety or disease.

## Biotechnology

The Federal Government is allocating \$17.5 million over the next two years to speed the introduction of comprehensive national legislation to regulate gene technology and to ensure that the Australian biotechnology industry is put on a secure footing.

A Ministerial Council for Biotechnology will be established.

### Background

Biotechnology promises to deliver benefits to Australia in better food and health care, more sustainable industries and more profitable agriculture.

Issues that need immediate Government attention include consultations with industry and others on what government, industry and researchers can do to remove impediments to the beneficial use of biotechnology. This will be set out in a National Biotechnology Strategy.

Agriculture and food industries will be significantly changed as they adopt biotechnology. Accordingly, consultations will be held to develop a National Biotechnology Strategy for Agriculture and Food which will be a component of the broader strategy and will involve input from State and Territory agriculture ministers.

Improved public awareness, better management of intellectual property and measures to enhance the proper use of genetic and other biological resources have already been identified as crucial to the proper adoption of gene technology in Australia.

### Impact

Biotechnology will have a broad influence on a range of activities in the future. The Ministerial Council for Biotechnology will ensure a consistent approach to biotechnology in agriculture, manufacturing and service industries, the environment, education and training, and health.

## Northern Australia Quarantine Strategy

The Federal Government has allocated additional funding of \$12.1 million over the next three financial years for the Northern Australia Quarantine Strategy (NAQS).

### Background

The Australian Quarantine and Inspection Service operates NAQS, which is designed to protect Australia from the entry of harmful pests, diseases and weeds through our northern borders.

NAQS was established in 1989 following a major evaluation of quarantine in

Australia and identified the need for a national strategy to meet the unique quarantine challenges facing northern Australia.

NAQS was expanded into three distinct but interacting sub-programs, NAQS Scientific, NAQS Operations and NAQS Public Awareness.

NAQS overall staffing increased by almost 100%. It included employing local islanders as Quarantine Officers in the Torres Strait, more scientific staff, a national coordinator for public awareness and expanding the Top Watch public awareness campaign.

Additional funding also allowed offshore pest and disease surveillance to be expanded, with annual surveys of Papua New Guinea and Irian Jaya providing valuable data on emerging pest and disease threats.

In 1998, the Quarantine and Exports Advisory Council (QEAC), which reports directly to the Minister for Agriculture, Fisheries and Forestry, reviewed the effectiveness of NAQS and recommended the service continue to receive additional Government funding to maintain present levels of activity.

### Impact

NAQS is well established in northern Australia and additional funding over the next three years will ensure existing activities continue across all three States and Territories and offshore. It will also allow resources to be reallocated to

give further emphasis to pest and disease surveillance and to raise awareness among remote Aboriginal communities.

Funding will continue to protect northern Australia from exotic pests, diseases and weeds. It will also ensure continued border surveillance activities; early warning through insect traps and sentinel cattle, pigs and bees; offshore surveillance; and awareness activities for communities, industry and the general public through the Top Watch campaign.



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## World Congress

### Are you going to the World Avocado Congress in Mexico?

The Congress is being held at Universidad Michoacana de San Nicolás de Hidalgo, in the city of Uruapan, Michoacan, Mexico, from 17-22 October, 1999. There will be pre-congress courses and workshops prior to the Congress during the week of 13-16 October.

For more details on the Congress program, tours, registration, etc, go to the Congress web site at: <http://www.aproam.com/congreso/>

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## California Avocado Shippers Hold On To Japan

By Doris Lee, Asiafruit, September/October 1998

Unfavourable weather conditions and a battle with the fruit pest 'thrips' are two of the problems California growers have endured this season.

California avocado growers have experienced difficult times this season. Last December's freeze in the Central Valley affected production, with losses reaching US\$15.5m. The fruit pest Scirothrips 'thrips' also had a major impact on output.

Latest estimates point towards a 244m lb crop for the 1997-98, a 20% decline on volumes harvested in 1996-97. The original estimate for 1998-99 was 271m lb but the reduction was due to normal crop cycles as well as thrips.

Thrips were initially discovered in California in July 1997 in Ventura County and San Diego. It affects the avocado skin and causes scarring which varies from elongated brown marks to discolouration of the skin. However, the pest does not affect the pulp of the avocado. The California Avocado Commission is currently working on new growing techniques that can solve this problem.

Output has also been affected by last December's freeze, which impacted on volumes. Despite the downturn, the quality of fruit is unlikely to be affected significantly. Some fruit were picked with cold damage or damage to stems from the freeze but the balance of the fruit that stays on the tree will be unaffectedly.

Lower volumes will inevitably bump up product prices making it more difficult to export to Japan from California.

The Golden State produces the vast majority of US avocados, accounting for 85-90% of total volume. Though it shipped 2,858 tonnes in 1996, volumes declined to 1,957 tonnes in 1997. This is despite the fact that Japan—by far California's largest market in Asia—has increased demand in recent years. Despite the volatility in exports, some consumers will always prefer the US product.

Last year, the California Avocado Commission held a series of promotional activities, including taste samplings and research and trade education. Research involved offering ripe fruit at the retail level, which further accelerate the growth of avocado sales.

First shipments of new season produce are expected to land in Japan in May. While Japan takes larger product counts 48, Hong Kong takes the smaller sizes. Approximately 80% of avocados are eaten in the Tokyo, Osaka and Nagoya areas. Retailers sell the majority of product, with demand for use in the food service industry accounting for about 20% of sales.

Exports out of California to Asia remain small, with shipments accounting for approximately 1-2% of the total crop. US shippers concede that the volatility of the yen has impacted on shipments to Japan, with consumers paying more for avocados. With a

reduced California crop, prices are non-competitive to the rest of the world market.

The US and Mexico are the only suppliers to Japan, exporting the Hass variety. As Mexican avocados are increasingly being supplied to the Asian markets, volumes are competing more heavily with US supplies.

US Avocado Exports 1993-94 to 1996-97 (in tonnes)

	1993-94	1994-95	1995-96	1996-97
Singapore	28	0	1	2
Korea	56	26	93	88
Hong Kong	71	61	44	80
Taiwan	0	0	1	3
Japan	1,940	2,086	2,719	1,784
Total	2,095	2,173	2,858	1,957

## Avocado Shippers Spy Strong Window of Opportunity

By Doris Lee, Asiafruit, September/October 1998

A growing number of US marketers are sourcing avocados from Mexico.

California avocados may be too expensive for Asian consumers this season, it appears that there is still demand for Mexican product. That's the opinion of many US marketers who source product from their neighbouring country.

Mexico is the largest avocado producer in the world. During the 1997-98 season, avocados were produced on approximately 95,000 hectares.

Mission Produce has been shipping Mexican avocados to Japan since 1985, Japan being one of their largest customers in the world, and they have the biggest market share of Mexican avocados in that country.

Other major players include Calavo, the California-based cooperative, which ships Mexican avocados out of its US\$5m Urapan, Michoacan, packhouse. Calavo considers Hong Kong offers growth opportunities, while China is the biggest potential market on the horizon.

But volatility in the region has tempered the avocado deal this season. Demand has remained stable with a few slight drops due in part to the economic challenges faced in Asia.

Ventura-based Fresh Directions International (FDI), believes that a lower California crop could further widen the window of opportunity for Mexican fruit. Created last July, FDI offers year-round supplies of Mexican avocados to Japan. The volatile yen has increased prices for importers but demand for larger sized product is continuing.

Although there is a significant price difference between size 24 and size 30 fruit, FDI's Japanese customers continue to prefer and ask for the larger size 24 and are willing to pay more for it even during the current economic downturn.

While Japan currently represents FDI's only Asian market, the company is looking at other key areas including China, Hong Kong and Korea for future sales.

## The California Avocado Commission

Created in 1961, the California Avocado Commission (CAC) is the official information source for California avocados and the California avocado industry. Chief among CAC's many objectives is to increase consumer awareness of and demand for the fruit on behalf of the state's 6,000 avocado growers. To do so, the Santa Ana-based Commission assesses growers a percentage-of-revenue fee allowed under California's Marketing Act to fund a variety of market-development programs in seven areas: Consumer Advertising, Public Relations, Merchandising, Nutrition, Foodservice, Industry Affairs/Production Research and InfoTech.

### Consumer Advertising

Working through its national advertising agency, CAC achieves "top-of-mind" awareness for California avocados by showcasing the fruit's versatility and other selected attributes. CAC's creatively charged radio and outdoor campaign for 1997, "The Very California Avocado," was met with widespread consumer and industry acclaim in the form of numerous international awards. 1998's campaign, "It's Not Wrong To be In Love With The Avocado," continued the strong creative presence on outdoor and radio.

### Public Relations

CAC utilises pro-active public relations programs to strengthen the fruit's image as a nutritious, versatile, tasty and fun fruit among food, news and lifestyle media, health professionals, doctors, consumers and other key "influencing" public. Key 1998 programs included the California Avocado Information Bureau, an ongoing media relations effort; expansion of the CAC website to include a special "News" page for media; and a full calendar of consumer promotions and special media events, including January's Avocado Bowl, now in its sixth year.

### Merchandising

CAC's ongoing "RipeMax!" technical and merchandising program leads the industry in providing retailers with direct, account-by-account technical assistance and merchandising support tailored to the specific needs of each retailer. Featured in-store tactics include audits, produce manager education, seasonal programs, customised promotions, display contests

and special vertical tactics directed at kids, diabetics, retail nutritionists and card-carrying retail "club" members.

### Nutrition

CAC works to dispel false myths surrounding the avocado by educating the media, doctors and educators that the fruit is cholesterol-free, nutrient-dense, low in saturated fat per serving, and an important part of a healthy diet. Tactics used to accomplish this goal include ongoing negotiations with the FDA to decrease the serving size required for the FDA label; the creation of educational collateral for general and vertical audiences; and the development and sponsorship of academic symposiums to uncover new evidence on the healthfulness of the fruit. CAC also annually distributes hundreds of recipes and usage ideas created in close cooperation with the National Cancer Institute, American Diabetic Association and 5 a Day for Better Health.

### Foodservice

By working closely with the foodservice industry—namely restaurants and prepared food distributors—CAC is able to significantly impact demand for California avocados and offer new consumers the opportunity to sample innovative new avocado recipes in a familiar setting. Targeted foodservice users range from mid-scale, family-style and five-star upmarket restaurants to the traditional Mexican-style establishments. For 1998, CAC launched "Blazing Avocados," the Commission's first-ever hot avocado promotion, and continues its close association with some of California's most innovative restaurateurs.

### Industry Affairs/Production Research

As the clearinghouse for all California avocado-related affairs, CAC has a responsibility of maintaining a position of leadership in a wide range of geopolitical issues affecting California's 6,000 avocado growers. To this end, the CAC's RadarScan program remains active in monitoring government legislation, produce industry trends and other developments in Washington DC and Sacramento. Recent issues requiring industry-wide action have included the recent lifting of USDA's ban on the importation of Mexican avocados into the US; water rates and

availability; nutrition and food safety; and anti-theft.

CAC also maintains an active Production Research Program to develop practical, applied research that enable growers to improve efficiencies in their own orchards. Specifically, CAC initiates and funds research in six primary areas: disease control, production improvement, post-harvest handling practices, plant nutrition regimes, propagation techniques and insect control.

### InfoTech

Through its award-winning website, [www.avocado.org](http://www.avocado.org), CAC leads the produce industry in the electronic dissemination of information to consumers, retailers and growers. The Commission remains firmly committed to using information technology not as an afterthought but as a primary means of educating its audiences and creating the calibre of operating and marketing synergy not often achieved by most organisations, profit or nonprofit.

## Avocado Holiday

Los Angeles (Business Wire). As America awoke on 5 May, the morning of the Mexican holiday, Cinco de Mayo, the Los Angeles Produce Market was already pulsing with festivities including a BLAZING avocado haute cuisine display.

The California Avocado Commission (CAC) reported that Americans ate more than 28 million avocados on Cinco de Mayo, the largest avocado consumption day. To celebrate, CAC hosted the earliest Cinco de Mayo fiesta at 3 a.m. in Los Angeles, the world's biggest market for California avocados.

Avocados were grilled and creatively showcased in traditional Mexican dishes and breakfast treats prepared by Chef, Owner Toribio Prado of Cha Cha Cha and CAVA restaurants.

The party was also attended by many of California's trade partners and avocado growers who sampled the BLAZING avocado treats as well as CAC's Official 1999 Cinco de Mayo Avocado Salsa, which can be found at the California Avocado Web site at [www.avocado.org](http://www.avocado.org).

# EPS Nothing Else Stacks Up

By Fiona Douglas, Marketplace News, April 1999

Expanded polystyrene or EPS produce boxes have been used for the transport of fruit and vegetables for more than 20 years.

The advantages are numerous; EPS is a lightweight, economical form of packaging that provides thermal resistance. The thermal resistance nature of EPS helps to counteract disturbances to the cool chain while produce is in transit.

EPS also has shock absorption characteristics that help protect fruit from the many hazards faced throughout the transport process. As fruit is loaded, unloaded and reloaded EPS offers a form of protection to fruit and vegetables.

Of equal importance is the strength and water resistance quality of EPS. Water resistance is a feature required for vegetables that are hydro-cooled. In addition, produce moved in and out of coolrooms needs strength to reduce pallet sag and subsequent damage of fruit.

Independent studies conducted by the Korean Food Research Institute (1997) have illustrated that EPS is the most effective packaging material for retaining nutritional values of fresh fruit and vegetables. The study showed that vitamin C levels stayed at a higher level in fruit and vegetables packed in EPS and effectively slowed the rate of spoilage.

## Waste Control

So what happens to the EPS produce box after it has delivered the produce safe and sound to the retailer?

The expanded polystyrene industry is part of the Plastics and Chemicals Industries Association (PACIA) which are in the process of setting up a national collection framework.

Compaction centres are funded by the EPS industry to collect and compact expanded polystyrene packaging. All types of EPS packaging are accepted at these centres, from produce boxes through to computer and electronic packaging.

EPS is 98% air; therefore the volume reduction from the compaction process is substantial.

There are many uses for recycled EPS. One of the uses incorporates granulated material into products used in the building industry. Products such as waffle pods can contain up to 50% recycled EPS and are used in the construction of concrete slabs. Granulate can also be directly incorporated into concrete for lightweighting.

"Craftrock" is a patented formula using up to 80% recycled EPS. The granulated EPS mixed with a variety of settable powders allows the product to be moulded into any shape. "Craftrock" can be handcrafted to create anything imaginable. Products to date created from "Craftrock" include decorative ornaments for the home and garden. The products are of high strength, water resistant, light and very hard wearing. Applications are also being developed for the building industry.

EPS can also be converted back to a resin form and used to mould a variety of plastic products such as video cases, pens and computer casing.

The Plastics and Chemicals Industry Association in conjunction with research agencies and plastic recyclers are working toward other commercial applications such as polystyrene garden sleepers. Such sleepers would replace traditional red-gum sleepers and would offer superior strength while resisting insect attacks and rotting.

According to a life cycle analysis conducted by the Melbourne University (1996) the environmental impact of EPS produce boxes is less than that of cardboard boxes. The environmental impact of EPS produce boxes is less than for fibre-board boxes performing the same task.

EPS is CFC free and is manufactured from a by-product of the petroleum industry.

## Do You Know Who You Are Selling To?

Relationship marketing is a common term used in business today. A good relationship between buyers and sellers is a critical component for generating good business growth.

The same relationship applies to growers and their agents. Many growers have had long term relationships with their agents. This means that they usually know and understand the facilities and reputation of their agents and can build a level of trust. At the same time the agents come to know the reputation of their growers for quality and reliability.

It is a fact of life however, that in the never ending chase for the promise of higher dollars, growers switch between agents. There is nothing wrong with this. However, growers should be encouraged not to switch from an agent who has been consistently reliable to another whom they know nothing about simply because of a promise of a higher dollar today.

We all know how delicate and precious avocados are to handle in the value chain. Before switching agents make sure you are satisfied that the newer agent can handle your avocados correctly. The higher price to you may be realised because of cost cutting in the handling area leading to poorer quality where it really matters—with the consumer.



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# Ethylene Ripening Protocols For Local And Export Market Avocados

An edited extract from a paper presented at Conference '97 by Allan Woolf, Donna McLeod, Jeremy Burdon, and Anne White, Horticulture and Food Research Institute of NZ, Auckland

A major focus of the HortResearch postharvest program at Mt Albert Research Centre in NZ, has been the development and refinement of ethylene ripening (or "pre-ripening") to provide ripe-to-eat product for the NZ and Australian markets.

To achieve consistently high quality produce, it must be understood the response of the fruit to the large number of factors involved in both carrying out the ethylene treatment, and the subsequent handling and storage of the fruit, affects fruit quality.

Variables in the treatment itself include; maturity at harvest/time of the season, delay between harvest and treatment, ethylene concentration, treatment duration and temperature, carbon dioxide buildup, and ethylene removal (venting) of the room/fruit. After treatment a further range of variables are involved including: the delay before coolstorage ("holding" time), holding temperature, storage temperature and duration, and finally the ripening temperature.

It is clear that these variables cannot all be examined in one season, hence, to reduce the number of variables, some factors have been held constant. These include the ethylene concentration at 100 ppm, treatment temperature at 17°C, and time after harvest at 2-3 days postharvest.

The current method of ripening New Zealand fruit for local market involves warming fruit to 17-20°C if it has been in coolstorage (≈12 hours), treating with ethylene and transferring fruit to 2-6°C after 0 to 3 days. Export market fruit are currently treated at a number of facilities in Australia and generally involves rewarming to ≈17°C, and ethylene treatment for 12 hours.

Disadvantages of the current methods include the uncertainty of operators in the capability of a given ethylene treatment to ripen fruit, a high input of time and labour, the possible unnecessary length of ethylene treatment (i.e. 2-3 day treatment), and the rewarming of coolstored fruit.

A large amount of work has been carried out over the last two seasons and it is not possible to present all these results. This article will present the effect of duration of

ethylene treatment in detail, and briefly summarise the effects of a range of ethylene treatment and storage scenarios on fruit quality and shelf life.

## General Methodology

'Hass' avocados were obtained from growers in the Whangarei area. Fruit were picked, packed, and handled in the standard commercial manner. Fruit were generally transported to Mt Albert Research Centre, Auckland by van (2½ hour drive).

For fruit that had been stored, external appearance and external chilling damage was examined on the day of removal from storage. Fruit were ripened in commercial trays at 20°C (1995-96), or 15°C (1996-97). When fruit were "late ripe" (determined by manual assessment of fruit firmness), fruit were cut and a range of quality parameters assessed.

In 1995-96 ethylene treatment was carried out by placing fruit into 20 litre containers and a saturating concentration of ethylene (100 ppm) applied for one of 5 different durations (up to 10 days). In 1996-97 ethylene treatments were carried out in 360 litre chambers equipped with a fan to ensure even air mixing. The atmospheric content (ethylene, oxygen and carbon dioxide) of treatment chambers was checked twice daily, and chambers were flushed as appropriate, then re-injected with ethylene. Approximately 100 g of lime was placed in each chamber to reduce the buildup of carbon dioxide.

In the 1996-97 season, the Anderson firmometer (a digital version of the South African firmometer) was employed to relate fruit firmness at various stages of the protocols to the shelf life and ripe-fruit quality.

## Duration of Ethylene Treatment

The current protocol for ethylene ripening in New Zealand involves rewarming fruit to 17°C, followed by ethylene treatment at 100 ppm for between 12 and ≈48 hours. For predominantly historical reasons, ethylene treatment has been carried out at 17°C. In the interests of maintaining the experience and knowledge base of the fruit response to ethylene treatment at this

temperature, there appears to be no good reason to move away from this treatment temperature.

The duration of exposure to ethylene has marked effects on the average shelf life (rate of ripening) and the variability of ripening (i.e. fruit to fruit variability). Because of the many variables involved in ethylene treatment the researchers chose to examine the effect of treatment duration alone by ripening the fruit at the same temperature as the treatment temperature (17°C). This allowed the determination of the effect of treatment duration on the rate, and variability of ripening without the confounding effects of subsequent holding times or storage temperatures.

## Aim

The aim was to examine the effect of ethylene treatment duration, and time of the season, on the rate of ripening. This would provide guidelines regarding minimum ethylene treatment times required to achieve maximum rate and synchrony of ripening at two times in the season.

## Materials and Methods

Fruit were harvested in November, 1996 (early season), and March, 1997 (late season). Fruit were randomised among trays, and half of the fruit placed in storage at 5.5°C for 10 days. The remaining half were placed at 17°C overnight, and ethylene treatment in 360 litre chambers the following morning (2 days postharvest). Similarly, for the stored fruit, trays were removed from storage, rewarmed to 17°C overnight, and ethylene treated the following morning.

Ethylene treatment durations were:

- Early season;** for both stored and non-stored fruit; 0 (control), 6, 12, 24, 36 or 48 hours.
- Late season;** non-stored fruit; 0 (control), 6, 12, 18, 24, or 36 hours, and stored fruit; 0 (control), 3, 6, 9, 12, or 24 hours. Ethylene levels ranged from

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

95-105 ppm in treatment chambers, carbon dioxide levels were less than 1.7% (typically 0.5-1.1%), and oxygen never less than 16%.

Three trays of 23 count fruit were used for each treatment. From two of these trays, firmometer measurements were made on 15 fruit at each evaluation time. This meant that each fruit was measured a maximum of 5 times (e.g. control treatments), but ethylene treated fruit were typically measured 3 times. Fruit in the third tray were not measured by firmometer, but, as fruit ripened, were manually assessed to determine the average shelf life (days to "late-ripe").

An analysis of variance (ANOVA) was carried for each of the 4 experimental runs. Four one way ANOVAs were carried out using a completely randomised design.

## Results

### Early season, November

Ethylene treatment accelerated ripening in both stored and non-stored fruit, the extent of which was dependent on duration of exposure.

For non-stored fruit, an ethylene treatment of 6 hours had little effect on shelf life; 10.3 days compared with 10.5 days for control fruit. As treatment duration increased up to 36 hours, shelf life progressively reduced to 6.4 days. There was no significant difference between a 24 and 36 hour treatment.

Fruit that had been stored for 10 days before ethylene treatment (simulated export) showed a markedly faster rate of ripening than non-stored fruit even without ethylene treatment (8.5 days compared with 10.5 days). Even a 6 hour treatment reduced shelf life by  $\approx 1$  day, and a 12 hour treatment reduced shelf life to a level similar to all longer treatments (24, 36 and 48 hour).

### Late season, March

For non-stored fruit, a 6 hour treatment reduced shelf life by over a day, and a 12 hour treatment by 4 days compared with non-treated fruit which had an average shelf life of 11.7 days. Treatment duration of 12 hours or longer resulted in the fastest ripening rate of  $\approx 7$  days. The firmometer softening curve demonstrated this since there was little difference between a 6 hour treatment and non-treated fruit, while the 12 hour treatment was only slightly slower than the longer durations.

Storing fruit for 10 days prior to ethylene treatment resulted in fruit with a

significantly shorter shelf life than non-stored fruit. All ethylene treatment durations increased ripening rate, even a treatment as short as 3 hours.

## Discussion

### Non-stored fruit

To increase ripening rates and minimise fruit to fruit variability, a treatment duration of 24 to 36 hours should be employed for early season fruit, and over the season this can be reduced to as little as 12 hours. This is similar to results obtained in 1995-96 season where, for fruit treated mid-season, a treatment of 24 hours, and to a lesser extent 12 hours, was as effective as longer durations.

### Stored fruit

For fruit stored at 5.5°C for 10 days, the duration of ethylene treatment required to obtain the fastest rate of ripening was 6 to 12 hours for early season fruit, reducing to only 3 hours by late season. Thus for fruit ethylene treated after storage, e.g. in Australia, a treatment duration of 6 to 12 hours, which is a significantly shorter treatment duration than for non-stored fruit (24 to 36 hours), can be employed. This is in agreement with results in 1995-96 which also found that a 12 hour treatment was sufficient to maximise ripening rate.

There are a number of benefits for the industry in using the correct ethylene treatment duration. Firstly, longer durations than required clearly involve a cost in terms of ethylene gas and unnecessary time in the treatment room, and also increase the risk of excessive carbon dioxide build-up. Secondly, shorter treatment times than required will fail to achieve the main goal of maximising ripening rate. In addition, the minimising of fruit variability is important in the handling and marketing of the crop since it means fruit are at a similar stage of ripening, and hence will respond more similarly to, for example, storage temperatures. This makes maintaining fruit quality of the entire consignment more achievable.

## Conclusion

For local market fruit (non-stored), early season fruit should be ethylene treated for 24 to 36 hours, and this duration should be reduced to 12 hours by the end of the season. For fruit exported to Australia (10 days storage at 5.5°C), early season fruit should be treated for 6 hours, and late season 3 hours.

## Treatment Protocols and Fruit Quality

Aside from the effect of duration of ethylene treatment (described above), the effect of the following variables on shelf life and fruit quality were examined:

- c. Ethylene treatment temperatures (17°C and  $\approx 6$ °C).
- d. Holding time at 17°C following ethylene treatment.
- e. Post-treatment storage temperatures (5.5, 4, and 2°C).

During the 1995-96 season, the researchers examined a wide range of possible scenarios including ethylene treatment of stored (6°C for 10 days) and non-stored fruit at 17°C and 6°C (for up to 2.5 and 12 days, respectively) followed by 14 days storage at 2°C, or direct ripening at 20°C. From these 40 treatments in 8 general scenarios, two main avenues were followed in the 1996-97 season. Firstly, to determine the optimum firmometer value at which fruit should be placed into storage to achieve the best fruit quality after 14 days storage at a range of temperatures. Secondly, the effect of ethylene treatment duration at 5.5°C on shelf life and fruit quality after storage was examined.

### 1995-96 Season

#### Ethylene treatment at 17°C

For fruit not stored prior to ethylene treatment (as would be employed for local market fruit), it was found that a 24 hour ethylene treatment increased fruit quality over non-ethylene treated fruit. Storing fruit at 2°C immediately after ethylene treatment resulted in a significant reduction in fruit quality, and no increase in the rate of ripening over that of controls.

Fruit stored for 10 days at 6°C, then ethylene treatment for 12 hours (as carried out by industry in Australia) reduced the ripening variability, thus allowing marketing fruit of more uniform ripeness and quality. There was a small increase in the rate of ripening and fruit quality was similar to that of non-treated fruit. Fruit stored at 2°C after ethylene treatment at 17°C, a scenario which would allow storage of fruit in a "ready to sell" state, reduced fruit quality.

#### Ethylene treatment at 6°C

For fruit not stored, ethylene treatment at 6°C for 60 hours resulted in better fruit quality than non-treated fruit but there was little increase in the rate of ripening.



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Ethylene treatments of longer durations reduced fruit quality. Short treatment durations followed by storage at 2°C show promise as a technique for ethylene treating prior to, or during, export of fruit with subsequent storage. These results confirmed the presence of ethylene at low temperatures can increase avocado softening.

Ethylene treatment at 6°C of stored fruit showed that a 60 hour ethylene treatment resulted in an increased rate of ripening and a reduction in ripening variability, but also there was a slight reduction in quality (10%).

### 1996-97 Season

#### Ethylene treatment 17°C

This experiment sought to determine the optimum fruit firmness (firmometer value) at which fruit should be placed into storage to achieve the best fruit quality after 14 days storage at a range of temperatures. This would also show whether fruit could be ethylene ripened on-shore and then exported to Australia.

Mid-season (mid-January) fruit were ethylene treated for 24 hours in a commercial ethylene ripening room. Fruit were

then held at 15°C for 5 holding times to achieve a range of firmometer values (up to ≈40). Fruit were then either ripened directly at 15°C or stored at 2, 4 or 5.5°C for 14 days and then ripened at 15°C. Fruit firmness was measured using the firmometer at appropriate points during treatment and ripening and fruit quality assessed when ripe.

Fruit not ethylene treated (control) and stored for 14 days at either 5.5°C or 4°C prior to ripening at 15°C had the best fruit quality. Storage at 2°C maintained firmness during storage but resulted in external chilling injury and reduced fruit quality. Increasing the holding period at 15°C prior to storage reduced fruit quality significantly, but had very little effect on shelf life following 14 days storage at 2-5.5°C. This emphasises the need to hold fruit at low temperatures and maintain a continuous coolchain.

Of all the ethylene treatments, only one treatment (79 hours holding at 15°C and storage at 5.5°C) increased ripening rate (the main purpose of ethylene treatment) whilst maintaining adequate fruit quality following 14 days storage. However,

although this treatment had fruit quality comparable to non-treated fruit, it resulted in a very short shelf life (2.6 days).

Research has shown that it is not feasible to ethylene treat fruit at 17°C and store fruit for 14 days and obtain adequate fruit quality.

#### Ethylene treatment at 5.5°C

The ultimate aim of research into the effect of ethylene treatment at 5.5°C on shelf life and fruit quality, is the development of a low-temperature ethylene ripening protocol that would allow fruit destined for export to be treated on-shore, or even during transportation. Mid-season fruit were ethylene treated at 5.5°C for 0, 24, 48 or 72 hours, then either ripened directly at 15°C, or stored at 2, 4, or 5.5°C for 14 days, then ripened at 15°C. Firmometer values were recorded at appropriate points and fruit quality assessed when ripe.

After 14 days storage (simulated exported to Australia), good fruit quality and rapid ripening were observed in fruit not treated with ethylene, and in fruit that had been ethylene treated at 5.5°C for 24 hours. The ethylene treatment protocol currently employed by industry (17°C following 14 days storage at 5.5°C) was found to result in no increase in ripening rate and significantly lower fruit quality than the two above treatments. This result (which confirmed the results in the 1995-96 season) suggests that fruit stored for 14 days or longer do not require ethylene treatment and indeed, such treatment may reduce fruit quality.

It was interesting to note that when fruit ripened at 15°C immediately after ethylene treatment at 5.5°C for between 48 and 72 hours ripened faster and were of good quality (≈90% sound fruit). Such a treatment scenario would mean ethylene treatment for local market fruit could be carried out at storage temperatures, thus avoiding the need for fruit rewarming.

### Overall Conclusion

The work to date demonstrates both the potential and complexity of possible treatment and handling regimes for ethylene ripening of avocados. Ongoing work will examine the possibility of low temperature ripening, and optimising protocols for local market fruit.

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# Coating To Enhance Fruit Life

An edited extract from a paper presented at Conference '97 by Nigel H. Banks, Jason W. Johnston, Rosemary A. Watson, Anna M. Kingsley and Bruce R. MacKay, Department of Plant Science and Centre for Postharvest and Refrigeration Research, Massey University, Palmerston North, New Zealand

Most of the New Zealand avocado export crop is currently marketed in Australia. If the industry is to develop new markets to spread marketing risk, low cost technologies are required to transport fruit further while maintaining high quality. Sea-freight is likely to be used but may result in fruit having very limited residual storage and shelf-life once they reach their destination market.

Weight loss is one of the critical causes of loss of value in avocados. The fruit can lose 1% of its weight each day at 20°C, 60% relative humidity, mostly through water loss.

To compensate for weight loss associated with extended transportation and storage periods, packhouses would need to over-pack export trays, directly adding to costs of production. In addition, weight loss can hasten ripening and increase incidence of physiological disorders and disease. Surface coatings provide one way in which water loss can be reduced, along with other standard postharvest technologies (refrigeration, high relative humidity storage and tray liners).

Many observers have noted that surface coatings can slow down some of the processes associated with ripening. This happens because some coatings behave at the fruit surface like the plastic film of a modified atmosphere package, excluding oxygen (O<sub>2</sub>) necessary for deterioration and causing accumulation of carbon dioxide (CO<sub>2</sub>). In short, such films act as a barrier to oxygen and carbon dioxide transfer. This has led to some extravagant claims that such coatings could replace much more sophisticated techniques such as controlled atmosphere storage and the more widely used refrigerated storage in maintaining quality of harvested horticultural produce.

This article explores the potential to use surface coatings to reduce weight loss and slow ripening of avocados without adversely affecting other aspects of fruit quality. The balance that must be struck to achieve low rates of water loss without excessive risk of fermentation and adverse effects on fruit quality is outlined together with the experimental approaches used to achieve this optimisation. The progress so far made in avocados is also reviewed.

## Benefits

### Reduced water loss

Some surface coatings are like the waxy natural fruit surface in that they are good barriers to water vapour. This reduces the rate at which water evaporates from the fruit surface and thereby slows loss of saleable weight. In many fruits, it can also delay loss of juiciness and the onset of visible shrivel, protecting produce from loss of value because of decline in quality. Tendency to lose water can be characterised by loss of fresh weight under standardised conditions.

### Slowed ripening

In addition to being good barriers to water diffusion, surface coatings hinder exchange of other gases between the fruit and its environment. This results in a reduction in permeance, a measure of how easily gases move through the fruit surface.

The natural process of respiration in avocados is very rapid during ripening. Coupled with reduced skin permeance caused by coating, this modifies the atmosphere inside the fruit, lowering internal O<sub>2</sub> and increasing internal CO<sub>2</sub>. Such modified internal atmospheres can slow ripening by direct effects on processes such as colour and textural change. Alternatively they may inhibit respiration, limiting availability of energy for deteriorative processes and conserving energy reserves of the tissue.

Benefits, in terms of reduced rate of ripening, are often achieved by the combined effects of both low O<sub>2</sub> and high CO<sub>2</sub>. Similar relationships are likely to apply for other processes associated with ripening such as respiration and softening. Such studies have yet to be conducted with avocados but suppression of ripening by surface coatings would be achieved in a similar way by the modified atmospheres that develop within the coated fruit.

## Risks

Whilst slowing ripening may appear to be an attractive possibility, using coatings for this purpose is a high-risk strategy. Unfortunately, when respiratory gas exchange through fruit skins is excessively impaired, off-odours and off-flavours may develop as fruit ferment and they may ripen unevenly. This risk can be minimised through selection of coatings with appropriate permeability

characteristics and careful management of storage and ripening temperatures.

Aside from the issue of avoiding physiological disorders, if different ripening processes differ in their dependency on levels of O<sub>2</sub> or CO<sub>2</sub>, then the modified atmosphere developed within the fruit can differentially affect these processes. This can readily be seen when pears are over waxed; the fruit may become soft whilst remaining green as colour change can be much more dramatically retarded than softening. Such "abnormal" ripening could be a serious consideration in the marketing of fruit in which ripening had been slowed by modified atmosphere techniques.

## Optimisation

If final marketability (MA) of the fruit were solely dependent upon one process such as softening, deterioration in fruit quality would be minimised by eliminating O<sub>2</sub> from the fruit's internal atmosphere and by increasing CO<sub>2</sub> to high levels. However, as outlined above, such a strategy would have adverse effects on other aspects of fruit quality.

To achieve the maximum MA benefit from a surface coating treatment, modification of the internal atmosphere becomes close to that at which the fruit begins to ferment. In the case of MA benefits, there is no clear separation of benefits and risks, as they are dependent upon the same mechanism—depression of O<sub>2</sub> and increase in CO<sub>2</sub> levels. At the current time, the belief is that these problems make use of surface coatings to achieve MA benefits too risk-laden for deliberate commercial application. Thus, optimisation of waxing for avocados will involve achieving a safe balance between reduced water loss and avoidance of disorders associated with excessive internal atmosphere modification.

Tendency to lose water can be measured by loss of fresh weight under standardised conditions. The oxygen status of a fruit can be monitored by sampling internal gases through an insertion into the fruit tissues. With these data, a plot of reduction in water loss (desired benefit) against reduction in



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internal oxygen level (major risk) can be used to select and optimise coatings which achieve desired benefits with acceptable levels of risk.

### Choice of coating material

Many different types of materials have been developed as surface coatings. Contemporary coatings include a collection of wax-type products which are generally good water vapour barriers and which add gloss to produce an attractive sheen or, when they do this to excess, shine.

Growing consumer resistance to the idea of waxing has led to exploration of a wide range of alternatives that are viewed as being more natural. Polysaccharides, such as the cellulose derivative carboxymethylcellulose (CMC), an extract from plant tissues and chitosan, extracted from shells of some types of seafood, add gloss but provide little protection against water loss.

Likewise, protein-based coatings such as the milk-protein casein and the wheat protein gluten have been widely experimented with in recent years. They form strong films but are also generally poor barriers to water loss. In this work, the focus has been mainly on wax coatings.

In 1996, use of full strength commercial formulations of wax coatings achieved between 30% and 50% reduction in rate of water loss from a single orchard. "Apple Clear" coating had the greatest benefit but was cosmetically unacceptable and, in common with "Citrus Gleam", resulted in very low internal O<sub>2</sub> (high risk). CMC and very dilute "Avocado Wax" (in use in one commercial avocado packhouse) were rejected because they provided little benefit.

The two materials that provided a large reduction in rate of water loss for a given reduction in internal O<sub>2</sub> were full strength Avocado Wax and "Citrusseal", both containing polyethylene-type waxes. This was consistent with previous work that showed that the relative permeance of polyethylene-type waxes to O<sub>2</sub> and water made them more effective barriers to water loss of fruits than other fruit coating waxes. Avocado Wax (Castle Chemicals, Australia) was selected as the material for further work for its relatively good performance and because it was already being used on avocados in New Zealand.

### Optimisation of wax concentration

With full strength Avocado wax, the absolute level of internal atmosphere modification in avocados at 20°C was too great to be considered optimal. Experiments with a

dilution series of this material indicated that about 11% provided a good balance of reduced rate of water loss without excessive depression of internal O<sub>2</sub>.

### Verification of suitability of treatment

Disorder development is much more likely to occur in coated fruits kept at high rather than low temperatures. In 1997, experiments were carried out with avocados from a greater range of sources using 10% Avocado wax and a more diverse range of ripening temperatures (15°C, 20°C and 25°C). Marketable life (time from receipt of fruit until they developed an unacceptable, externally visible defect) declined at higher ripening temperatures but was slightly enhanced by coating. This was associated with delayed onset of anthracnose rots in coated fruit, probably as a result of a slight delay in ripening.

These positive effects were countered by exacerbation of a ripening disorder in which a proportion of the flesh remained hard whilst the remainder of the flesh softened normally. The disorder was only present in control fruit at high ripening temperature.

In waxed fruit, the disorder was present at all 3 temperatures but it was most severe at 25°C. The belief is that this was the result of excessive internal atmosphere modification in the coated fruit at the high temperature, an effect linked to elevated respiration rate of fruit at high temperatures and, particularly, to high internal CO<sub>2</sub> levels.

Researchers have recently characterised and explained similar effects on gas exchange in apples in which O<sub>2</sub> was reduced and CO<sub>2</sub> was increased more by waxing in fruit kept at high rather than low

temperatures. For waxing to be used with confidence on avocados, excessively high temperatures would need to be avoided during ripening of the fruit. This would presumably be easier to achieve at some times of year, and in some destination markets, than in others.

### **Recommendations**

Based on the above information, the following recommendations are made:

- Technological development should run hand in hand with, and preferably ahead of, commercial applications of the technology to prevent occasional mismatches of coating and produce, and the negative reaction in consumers that this would cause.
- Only low concentrations of wax should be applied to avocados (e.g. 10% of commercial formulation).
- Ripening temperatures should be managed even more carefully for waxed avocados than for non-waxed controls.

### **Concluding comments**

Surface coatings can have marked effects upon the quality of avocados. Potential to reduce weight loss is associated with some level of risk (fermentation and disorder development associated with excessive internal atmosphere modification). The immediate challenge for scientists working in this area is to achieve high levels of benefit without serious risk to quality. In avocado, this seems likely to be quite feasible provided optimised levels of coating are applied to fruit that are then ripened at carefully managed temperatures.

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An adult and nymph Fruit Spotting bug *Amblypelta nitida*