

AUSTRALIAN AVOCADO
GROWERS' FEDERATION

- The Australian Newsline
Third Edition
August/September 1990

Talking Avocados

More Evidence - Avocados lower blood cholesterol

Research presented to the Australian Avocado Growers' Federations (AAGF) biennial conference at the Gold Coast has proven that avocados lower blood cholesterol.

A consultant cardiologist at the Wesley Hospital, Dr David Colquhoun, carried out a study comparing the effects of an avocado-enriched diet with a moderately low-fat diet.

The study of 15 people showed that the avocado enriched diet had a favourable effect on blood fats with a significant decrease in total cholesterol.

Dr Colquhoun said one of the most important facts was that the level of high density lipoproteins (HDL) - which protect

the blood vessel walls from a buildup of cholesterol - was preserved.

"In comparison, the low fat diet decreased the HDL as well as being less effective in lowering low density lipoproteins (LDL) - the lipoprotein which causes the most damage.

Dr Colquhoun's conclusion from the study was that an avocado-enriched diet produced a favourable effect on blood fats, decreased LDL and was also nutritionally balanced.

The study suggests avocados should no longer be avoided by people with elevated blood cholesterol and would be an important addition to cholesterol-lowering diets," Dr Colquhoun said.

Coronary artery disease is the major cause of death in Australia. The underlying problem is the buildup of cholesterol and other substances in the coronary arteries.

Elevated blood cholesterol is common in Australia with levels being determined by genetics and lifestyle, especially the intake of food.

The intake of saturated fat which increases LDL's is the most important aspect of the food we eat.

However, avocados contain monounsaturated fats which have been shown to maintain HDL levels while lowering cholesterol.

If you want results...stick to it

Keith Johnson, Avocado Grower, Alstonville, Northern NSW

One of the recent success stories in the avocado industry is the CHOLESTEROL FREE CAMPAIGN. Over a period of three years a consistent and clear message was put across to consumers. That message: avocados are CHOLESTEROL FREE. The results: a majority of consumers now know that avocados are indeed cholesterol free.

There were many aspects to that campaign and the Rosemary Stanton leaflet was a major one because of its high profile and credibility. However, I believe the CHOLESTEROL FREE stickers placed directly on the avocados ended up as the workhorse of the campaign...they were decisive in terms of reaching the consumer and driving the message home.

It is worth reviewing the value of the stickers and seeing why they were effective in this case. Reason? if you

have a good technique...then use it. So what was it about the stickers that worked?

● **SIMPLE MESSAGE:** In just two words 'CHOLESTEROL FREE' everything that needed to be said was said. One of the golden rules is Keep it Simple and that sticker message was as simple as it gets.

● **REPETITION:** You have all been subjected to repeated and repeated advertising. Why? because it takes high exposure of the message before it gets remembered and even more exposure before it is accepted. The stickers had very high repetition...about 20% of all avocados going to market were stickered. About 3 to 4 million stickers were used over a three year period.

● **VISIBILITY:** You have to put your simple message across frequently...but that is not enough. The message has to be visible to

your consumer and it is best if the message can not be avoided. Stickers on fruit are as visible as you can get. AND, stickers on fruit in a fruit shop, are visible to precisely the person you are aiming the message at ... actual and would-be retail avocado buyers.

● **RELEVANT:** Finally, the message should be useful to the consumer by providing needed information or meeting some other consumer need. Given that many consumers had cause to think avocados were bad for their health...the CHOLESTEROL FREE message was highly relevant.

So I think we can all see how effective the stickers have been...and why. The interesting point for us all now is that we have a technique the whole avocado industry can use to put across a common message about our product. We know



that the stickers work when putting across a simple common message so why don't we all work together and put across a message that will really build consumer acceptance even further.

The AAGF at the APRIL 90 meeting adopted the sticker message for 1990/91 as **16 VITAMINS AND MINERALS**

This message on a sticker will have the "16" in the middle of the sticker with "VITAMINS" above the 16 and around the top edge and "MINERALS" below the 16 and around the bottom edge of the sticker. The message itself is of course vitally important...it is telling consumers that avocados are highly valuable as a natural source of vitamins and minerals.

It now simply remains for the members of our industry to use stickers with this message. That of course is the hard part ... it seems we have plenty of people who want to talk about issues like industry unity...but when it comes to acting it is a different story. So, to assist people to use stickers for the first time or to change over to the "16 VITAMINS & MINERALS" sticker the NSW Avocado Association has made the following offer.

Stickers will be bought in bulk by the NSW Avocado Association and thus obtain sizeable discounts. These savings will be passed on to any grower who wishes to buy stickers from the Association. We have done preliminary costing and obtained quotes and can offer stickers made by ESSELTE-METO as follows:

- \$1.65/roll for rolls containing 1500 stickers. Stickers are in two colour combinations. Black printing on red sticker or Yellow printing on Green sticker. You can buy as many or as few rolls as you wish. Postage is extra and charged at actual cost.
- \$65.00/gun for the applicator gun, plus postage.
- The contact is STEVE MILLS Phone 066 283 484, or write to S. MILLS Red Lane Asltonville, NSW, 2477
- Goods will be sent after receipt of payment, or cheque clears, as we have found this method avoids all the hassles of chasing slow or non payers.

A few words of explanation on a number of points. Firstly, we chose ESSELTE-METO because their product is very satisfactory and they are by far the cheapest. Even if you already own an applicator for another brand you will find changing over to ESSELTE-METO cheaper. We do not wish to name other brands but can say that on the basis of the quotes we received you can buy an ESSELTE-METO applicator gun (@\$65) with the money you save on the first 50 rolls. (50 rolls is enough for 2500 cartons).

Using the ESSELTE-METO stickers you will pay 3c/carton for the stickers, which is a reasonable price to pay for the result you get.

If you do not wish to change to ESSELTE-METO at least adopt th sticker message "16 VITAMINS & MINERALS". You will find that if a group get together to buy stickers with this message you will get a much better price per roll than if you go it alone. As a minimum you will be able to split the cost of the printing plate @\$125.

Next is the question of why you should give up using your own sticker with your brand on it and adopt the industry approved sticker message.

A pretty sticker on fruit - irrespective of the words on the stickers - makes the fruit more attractive to the consumer. However, the words on the sticker mean little or nothing to the vast majority of buyers unless those words relate to the buyer's need for information about avocados. The growers name or brand simply does not inform about the product...only the producer.

Ah I hear you say..my brand is very important because my agent tells me often about the retailers who come back and say they want my brand again. Quite correct...your brand is important...and that is why you should have it on your CARTON so the retailer can see it and pick it out from the lesser brands on the agents stand. The consumer on the other hand has to decide IF avocados are worth buying...the message about nutrition helps with that decision. But the message "JOE BLOWS AVOS" does not tell the consumer anything about avocados.

If you are still not convinced consider this simple fact. When avocados are displayed in the retailers fruit department there is only one display. They are not giving the consumer a choice of whose avocados to buy...the only choice is whether to buy an avocado or not. On the other hand in the Baked Beans department you can see several brands offered, Heinz, PMU, Black & Gold etc. If the consumer cannot choose between brands because there is only one brand offered then the brand cannot be a decisive factor in the buying decision.

So, if you already have your own sticker in use why not switch to the industry orientated sticker and be part of getting the powerful message across to your consumers...avocados are good for you...they must be because they have 16 VITAMINS & MINERALS.

Do not leave it to that "someone else" to do your bit...every additional grower using the sticker means more consumers get the message...in other words every bit helps and every bit counts.

You will never get your stickers cheaper than our offer so decide now to join in this simple and effective program. Ring STEVE MILLS ON 066 283 484 TO PLACE YOUR ORDER.

Keeping in Touch

Western Australian growers have suffered during July and August with unseasonal heavy frosts followed by severe windstorms. However, this has not deterred them from several promotional activities planned as part of their objective to promote AVOCADO AWARENESS throughout the State.

Firstly, a successful presentation to Perth's morning radio announcers, emphasising the advantages of AVOCADOS as an ideal breakfast food, resulted in widespread mention on the airwaves.

In July, in conjunction with the West Australian branch of THE VARIETY CLUB OF AUSTRALIA, an extremely successful AVOCADO LUNCH was held at the Broadway Tavern in Nedlands, Perth.

The Ladies of Variety enjoyed AVOCADO SOUP, followed by an AVOCADO FAN garnishing a collation of seafood, including squid, mussels and lobster. The main course offered a choice of AVOCADO & CHICKEN IN FILO or VEAL SCHNITZEL garnished with PUREED AVOCADO AND MELTED CHEESE. Dessert was a delicious AVOCADO CHEESECAKE served with lashings of whipped cream and strawberries.

The Avocado Growers Association of W.A. committee was well represented by Dave and Helen Duncan of Avonova in Wanneroo, who supplied the fruit for the lunch; Nola Washer and her son Stewart from Avowest, also in Wanneroo, Phil Franzone and Pam Dorsey from Settlers Plantation in Baldyville, Jenny and Wayne Franceschi from Avonova in Pemberton; and Tom Lewis, whose orchard is in Jandakot.

After lunch, Mike Dorsey, former star of television's Number 96, entertained the guests with some amusing anecdotes about the origins of the avocado and some of its more obscure uses.

The function was very well received, and the Variety Club has expressed a desire to make the AVOCADO LUNCH an annual event.

The Variety Club is an International Children's Charity, in which 97 cents in every dollar raised goes towards the purchase of medical equipment or similar necessary items to help sick and needy children.

Well done, WA! Ed.

Any enquires regarding articles or advertisements in *Talking Avocados* should be directed to:
Marie Piccone, Editor,
Talking Avocados
PO Box 1393 Townsville 4810
Ph (077) 71 3388, Fax (077) 21 2481

PLEASE COMPLETE AND RETURN TO:

Mr R Boyle, Secretary, Australian Avocado Growers' Federation, PO Box 19 Brisbane Market Qld 4106

NB Responses from different members of the same business will be happily accepted.

Name: (optional) _____

Your State & Postcode: (+Country if outside Australia) _____

Your role in the industry: (grower/merchant/chemical rep etc) _____

Position in your business: (partner/employee/leading hand etc) _____

State whether you have already presented a response at Conference 90: YES / NO

What are the Industry Goals?

Please place these industry goals in your order of priority by placing numbers 1 to 8 in the box.
1 being the highest priority goals.

- Encourage **EXPORT** to total 20% of total throughput.
- Encourage **PROCESSING** - at least one marketable product.
- Lift **PRODUCTION EFFICIENCY**:
Raise orchard average to 20 tonnes per Ha
Encourage small trees, high density layouts
Reduce fruit reject rate to less than 10%
Minimum pesticides, orchard monitoring.
- Improve **PRODUCT QUALITY**
- A **MARKET DRIVEN** outlook, **QUALITY ASSURANCE** in place:
Industry responsive to demand - variety, size, colour, quality,
ripe fruit
Minimum pesticides
- Encourage **MARKETING GROUPS**
Packing co-operatives
Growers uniting in a climate of mutual trust
- Strive for better **VARIETIES**, undesirable ones eliminated:
AAGF to list varieties recommended/recommended against
Encourage growers to topwork undesirable ones
Look for replacement for Fuerte
- EDUCATION PROGRAM FOR RETAILERS** in place.

If you have additional important goals, add these to the list and score with a number:

How can research help us achieve these goals?

How should we rank the industry's research priorities from the items on the following list?

Please place the major headings in your order of priority by placing numbers 1 to 6 in the boxes.

1 should represent your highest priority.

Tick each item within each major heading that influenced your decision.

- MARKET RESEARCH**
 - Market Identification
 - Retailer Requirements
 - Export Market Identification
 - Alternative Products/Processing
 - Consumer Requirements

- VARIETIES**
 - Market Acceptance
 - Tree Size, Openness/Ease of Management
 - Productivity
 - Tolerance to Adverse Conditions (Salt, Frost etc)
 - Pest and Disease Resistance

- DISEASES AND PESTS OF THE TREE**
 - Viruses/Viroids
 - Leaf Roller
 - Rootrot
 - Looper
 - Verticillium
 - Mites
 - Red Shouldered Leaf Beetle (Monolepta)

- DISEASES OR PESTS OF THE FRUIT**
 - Anthracoise/Stem End Rot
 - Scale
 - Fruit Spotting Bug
 - Orchard Monitoring
 - Fruit Fly
 - Spray Equipment
 - Red Shouldered Leaf Beetle (Monolepta)
 - Biological Control
 - Leaf Roller
 - Safer Pesticides
 - Looper
 - Spray Drift

- YIELD/PRODUCTIVITY**
 - Canopy Management (Tree Size)
 - Nutrition
 - Pruning
 - Irrigation
 - Tree Spacing/Tree Removal
 - Weed Control
 - Growth Regulators
 - Biennial Bearing (Regularity)

- POST HARVEST CARE**
 - Fruit Handling Systems
 - Quality Assurance
 - Maturity Indicators
 - Long Term Storage
 - Refrigeration
 - Greater Consistency of Fruit Quality
 - Ripening
 - Fruit Shelf Life



Keeping in Touch

Market Feedback

From the Secretary's Desk

● Time flies when you're having fun - and that is exactly what happened at Conference 90 in July at Hotel Conrad on the Gold Coast. I have had tremendous feedback from those people who attended, with a common comment being that it was too short. Federation experimented with a new format this year and it would appear to have been hugely successful. My thanks go to my Secretary, Kelly O'Brien for her assistance and also to David and Joy Rankine, John and Christine Williams and Alex Banks for their invaluable help. 1990 was only the beginning of a change and the future for AAGF is indeed bright and challenging.

● Conference proceedings are still available from this office at a cost of ten dollars. The fabulous grade standard colour wall charts are now on sale for \$20 + postage. These posters should be a priority for every packing shed as well as wholesalers. Ten years of work went into producing this chart and our thanks go to QDPI for their dedication.

● Members wishing to be put on the list to receive the Californian Avocado Society Yearbook - a most informative publication - can do so by contacting Kelly on 07 379 0230. One proviso is that the book is read quickly and returned for the next reader. This is a free service.

● The COD public relations officer is owed our gratitude for her wonderful work in pushing the Colquhoun cholesterol findings. The industry has received wide-spread media coverage of the good doctor's research results. This project, that proved that avocados lower cholesterol in a low-fat diet, was funded by AAGF. Thanks Claire.

● Bad news from Western Australia with growers being hit by 9 frosts and strong winds resulting in heavy fruit drop. Rotten luck when all signs pointed to a good result this year. I recently attended the Australian United Fresh Conference in Melbourne and met a lady from the Mildura Citrus Growers who told me that our Sunraysia President, Marion Matthews, won the Victorian Young Rural Achiever Award for 1990. Our hearty congratulations to a deserved recipient.

● The vibes for the future are good, positive steps are being taken, we are going forward and exciting times lie ahead.

Cheers
Ross Boyle

Robert Curro (Fruitlink, Sydney Wholesale Markets) spoke to the editor in late August. He specialises in handling and marketing avocados and gave his impressions on the situation in Sydney.

1. What are the factors that are currently making avocados poor quality?

Quality is still a significant problem. Factors are, generally, poor visual appearance and breakdown at, or previous to, time of consumption. Excessive rain and adverse weather during the last eighteen months have greatly contributed to the quality problem.

2. What are the trends in price this season?

At the beginning and end of the season, prices can be erratic and often can vary weekly and even daily. Prices tend to stabilize during mid season when both supply and quality are predictable. This year in a season when prices should have been higher than normal, the quality problems have very often offset prices in the average lines of fruit.

However prices will rise dramatically with the onset of warm weather. Unfortunately the avocado is perceived by many consumers as a 'cold food' e.g. in salads etc. Promoting avocados as 'hot food' would definitely assist winter sales.

3. Is maturity a big problem?

Maturity levels always seem to be a problem. Immature fruit always takes too long to ripen, even with the assistance of ethylene gas. This fruit when purchased by the consumer often sits in the fruit bowl for a long period thus slowing the whole process of sale through to consumption.

4. What are your views on ripening avocados?

The demand for ripe fruit will vary throughout the year, and depends largely on climate.

In Sydney, demand for ripe fruit is at its highest early season (say March, April, May). Buyers are wary of the sincerity and maturity of early season fruit. In other words they don't trust the fruit. They are more inclined to buy it ripe so that at the point of sale they can see exactly what they are purchasing.

During the colder months of July and August demand for ripened fruit is also strong, particularly from the restaurants and providers. The cold weather slows down the ripening process and if retailers don't have ripe fruit on hand they will lose sales. Remember, consumer demands are more often than not based on impulsive buying.

On the other hand some retailers will not purchase ripened avocados. The reason given being that ripe fruit (particularly

green skins) suffer too much handling damage before reaching point of sale at store level. They prefer to buy ahead and ripen their own stocks. Country buyers also are concerned with the handling damage to ripe fruit with extra distances involved.

5. Can you think of anything industry, groups or individuals can do to promote sales?

The promotion of avocados as a 'hot food' has to help improve sales during the peak production periods of May through to August. Many consumers perceive the avocado as a cold food/salad type fruit and although this is important during the warmer months we must advance the idea of hot food.

Generally, give the consumer a quality product, and back up sales will be assured.

6. What is the response to different varieties in the Sydney market?

The Hass avocado is the most preferred in Sydney, followed by Sharwil then Fuerte with Wurtz and then Rincon and Hazzard at the bottom of the ladder.

Other varieties (except Shepard which are successfully grown on the tablelands) are neither necessary nor in demand.

The preference for the Hass variety is three fold i.e. it involves the wholesale, the retailer and the consumer. The main reason for the choice is that the Hass fruit is the most reliable with very little waste. Also, the flavour of Hass is most acceptable to a large majority of people and this reflects in higher demand and therefore sales.

In Sydney sales for ripe fruit started to improve dramatically about three or four years ago. Hass, being the hardiest of all varieties fits the bill. Some buyers who will not buy ripe green skins, will purchase ripened Hass.

7. What are the main changes you think industry (as individuals or a whole) should be making to keep pace with the needs of the market?

Growers need to tidy up their marketing. Firstly quality is a must, and that quality must be consistent throughout the whole consignment.

You don't have to be a large grower to attain orderly marketing. Many growers will market three of four different varieties (including two grades) in each consignment. Pick and market each variety in order of production.

The majority of consumers buy with their eyes. Presentation is essential for successful sales to be attained. So it's not a matter of how much more I will get if I do this or do that e.g. stickers etc, but it's a matter of doing all these things to survive in a very competitive food industry.



Ph may be dangerously low

With the 1989 and 1990 wet season and the recommendations to avocado growers of lower target pHs 5.0 (CaCl₂) or 6.0 (1:5 water)) to reduce the impact of *Phytophthora cinnamomi* some soils have become very acid.

Nitrogenous fertilizers together with leaching rainfall can quickly reduce pH to 4.0 (CaCl₂) and below. Low pH means a low cation exchange capacity (see figure 1) and this in turn makes it very difficult for avocado trees to absorb the required cations from the soil to produce the energy to hold a heavy healthy crop of fruit.

A long term soil management trial on red soils in NSW showed that as pH increases so does cation exchange. When the major cations (Ca, Mg and K) were added together over a range of pH's the graph on Figure 1 showed an increase in pH as the cations increased.

The easiest way to increase cation exchange capacity is to add microfine agricultural lime or fine dolomite. What liming material is chosen is dependent on the outcome of a leaf and soil analysis (pH and calcium and magnesium content and ratio). One soil analysis that came to hand showed a water (1:5) pH of 4.4 (which would be a CaCl₂ pH of about 3.8). The cation exchange capacity was less than 3.5 when it should be about 10 or 15 millequivalents. Over 50% of the exchange capacity of the soil was occupied by aluminium which would make the soil suitable for growing tea and not avocados. At this low level of cation exchange capacity elements like Ca, Mg and K can hardly be held on the exchange sites of the soil particles.

Leaching rain easily removes the few remaining cations and the tree becomes starved for nutrients. Phosphorous acid had given many growers a false sense of security. Phosphorous acid gives the trees a temporary lift because it combats the debilitating effects of *Phytophthora* root rot but it does not restore trees to full health if trees are not growing in an environment where they can obtain the necessary nutrients.

The problem is further exacerbated by the use of nitrogenous fertilisers. The type of N fertiliser has a big impact on acidification. Sulphate of ammonia and Monoammonium phosphate (MAP) are more acidifying than Diammonium phosphate (DAP). DAP is more acidifying than Ammonium nitrate or Urea. Calcium nitrate is an alkaline fertiliser. (See Table 1) Figure 2 explains how much lime is needed to counteract the effects of N fertiliser. It assumes two levels of leaching: Nil and during high rainfall when 100% leaching is achieved.

T. Trochoulis, Special Research Horticulturist
I. Vimpany, Senior Chemist
Tropical Fruit Research Station Alstonville

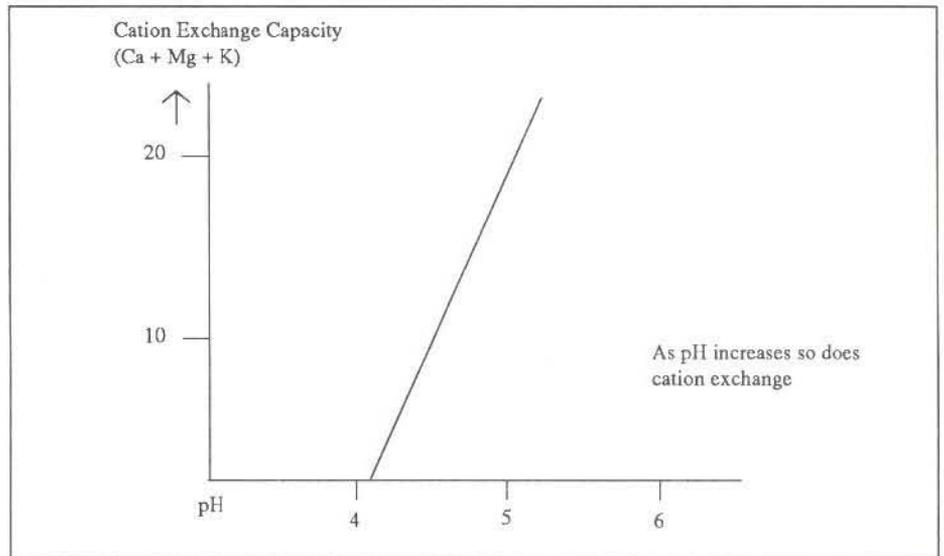
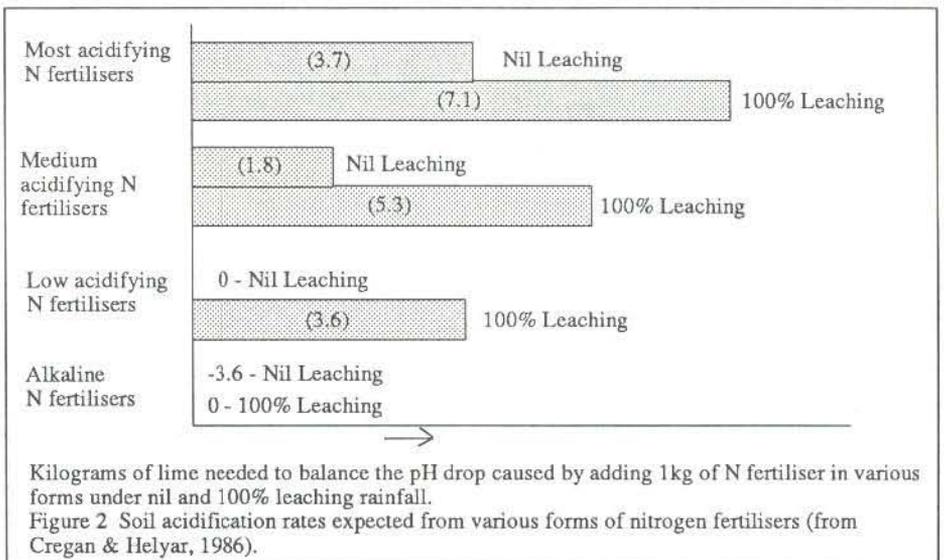


Figure 1. Relationship between pH and cation exchange capacity.

Table 1
N Fertiliser and Various Acidification Classes

Rating	Explanation	Examples
Most acidifying	lowers pH considerably	Sulphate of ammonia MAP (Monoammonium phosphate)
Medium acidification	lowers pH	DAP (diammonium phosphate)
Low acidification	lowers pH moderately	Urea Ammonium nitrate Aqua ammonia Anhydrous ammonia Biologically fixed (legume) N
Alkaline fertilisers	raises pH	Sodium nitrate Calcium nitrate





Helpful Fertilizer Hints

Leffingwell district manager Ken Gemmill offers the following suggestions for maximizing your fertilizer benefits.

- Decide fertilization is as important as your other inputs.
- Spend time with your trees, listen to what they are saying, and respond to their needs.
- Don't make micronutrients second cousins.
- Do tissue testing.
- Don't expect your tree to have the same needs six months after your last tissue test. Re-test prior to every application and modify your program accordingly.
- Carefully time your applications.
- Don't rely exclusively on the results of your tissue test. If a nutrient is in the adequate range yet the tree shows signs of wanting more, believe the tree.
- Always seek a balanced approach to fertilization by knowing what nutrients affect the absorption of others and plan your program accordingly.
- Use every resource available and question everyone you can to develop the best fertilizer program ever.

(taken from *California Grower*, January, 1990)

THE FEDERATION

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Delegates who represent the member states on the parent body, the Australian Avocado Growers Federation (AAGF) are as follows:

PRESIDENT:

David Rankine Ph (075) 45 1046

VICE PRESIDENT:

Ross Richards Ph (085) 85 3178

CHAIRMAN, VARIETIES COMMITTEE:

Don Lavers Ph (070) 93 3773

QUEENSLAND:

Dick Armstrong, David Rankine,
Don Lavers, Brian Capamagian,
Charles Dimes

NEW SOUTH WALES:

Warren Meredith, Ashton Gough,
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WEST AUSTRALIA:

John Galatis Ph (09) 525 2066

This is the growers paper and reflects their views and opinions; it does not necessarily represent the policies or views of the President, Committee or the members of the AAGF.

Thinking about Zincing your trees?

Graham Price, Agricultural Services Supervisor, Incitec, Brisbane

Why think about zinc?

Because zinc is a plant micro-nutrient and as such is essential in only small amounts (50-200 g/ha/year) for healthy plant growth and production.

Where do trees obtain their zinc?

Virtually all the zinc found in plants enters the roots with the soil solution, which contains a very small part of the total soil zinc (see figure 1). A second and larger pool of zinc (exchangeable) is attached to the surface of clay particles and organic matter. These two pools maintain constant relative concentrations (equilibrium). Most of the soil zinc (unavailable) occurs as a part of several minerals.

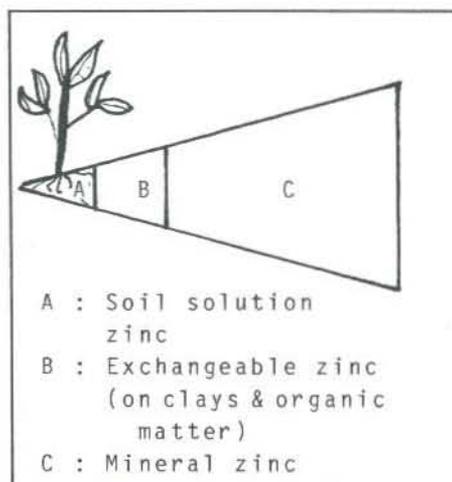


Figure 1. Availability of zinc in soil.

Why don't trees take up sufficient zinc?

Some soils (e.g. sands) have a low total zinc status. In others, certain properties of the soil or farm practices can reduce the availability of zinc. Two types of unavailability occur; chemical and locational.

Chemical unavailability: when the soil pH rises above 6.5 or falls below 5.0, zinc concentration in the soil solution declines. High rates of fertilizer phosphate also reduce zinc availability.

Locational unavailability: as zinc is absorbed by roots, a depletion zone of soil solution zinc develops adjacent to the root, (see figure 2). Zinc must move, often quite slowly, from adjacent zones to maintain concentration. Most zinc is located in the top 10-15 cm of soil. Zinc movement in soils is slow, so deep-rooted plants often have difficulty obtaining sufficient zinc from the deeper zones of the soil (see figure 3).

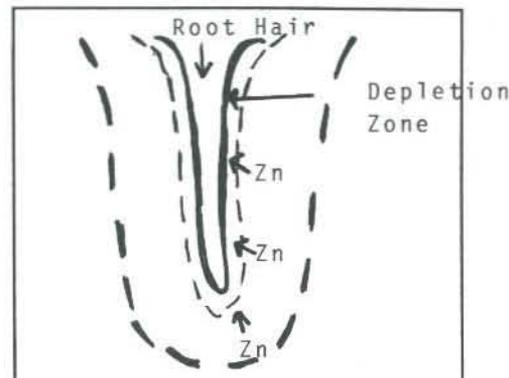


Figure 2. Depletion zones around root

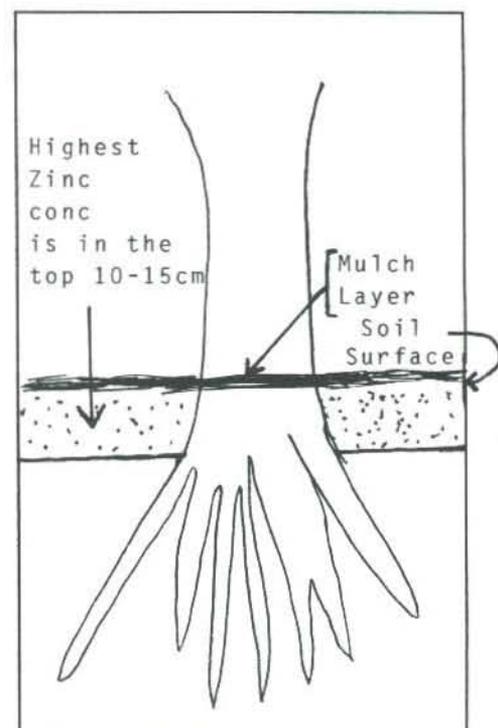


Figure 3. Locational unavailability of zinc

How do plants take up zinc?

Plants prefer to take up zinc via the soil solution, as the plant roots take up water.

Zinc can be absorbed through the leaves (from foliar sprays, e.g. zinc sulfate, zinc chelate). However, insufficient zinc can be absorbed in this manner, especially in avocados.

As zinc is involved in enzyme actions at new root and shoot growing points and in protein manufacture, it is essential that most zinc be taken up by the roots.

Zinc should feature prominently in the fertilizer programme of most avocado growers.





Did you know? A major breakthrough?

Advice has been received from the New Zealand quarantine authorities (MAFQM) that avocados can be imported from Australia under permit. This is an interim arrangement until an appendix covering avocados can be developed and incorporated into the Bilateral Quarantine Agreement.

During this interim period import permit issued by MAFQM for each consignment must be sighted by inspectors before inspection proceeds.

Special permit conditions will be as follows:

1. Produce to be packed in clean, new packages and accompanied by a phytosanitary certificate endorsed to the effect that the fruit:
 - (a) was from a property where all avocado trees were propagated from stock that had been tested under an official scheme and found free from sunblotch viroid; and
 - (b) was either grown and packed in an area not less than 80 km from an area where damaging species of fruit fly (family Tephritidae) exist; or
 - (c) was fumigated with ethylene dibromide (EDB) at the rate of 22g/m³ for 2 hours at 20°C or greater.
 2. A 600 fruit sample will be inspected in Australia and New Zealand to determine freedom from fruit flies.
- Before endorsement of 1(a) can be made,

documentary evidence supporting the claim is to be sighted by the inspector. Proof of registration of properties, or parts of properties under the Avocado Nursery Voluntary Accreditation Scheme (ANVAS) or its predecessor, the Virus Tested Tree Registration program (VTTR) would be suitable. A layout map of the accredited block would be required by Australian quarantine inspectors to prove that the block being harvested is actually VTTR accredited. Both AQIS and MAFQM officials are requesting that a satisfactory system to ensure fruit from accredited blocks is kept separate during harvesting and post-harvest handling is in place before the following clauses could be considered for inclusion:- If only part of a property satisfies the conditions for accreditation, then only fruit from the accredited part can be submitted for export. In this case mechanisms are to be in place in packing rooms to separate fruit from accredited and non-accredited sources.

Any suggestions on a set procedure/system to ensure separate handling of fruit should be directed in writing to the AAGF Secretary, COD, PO Box 19, Brisbane Markets 4106. The Federation will pass the suggestions on to John Gillette, AQIS who is negotiating the agreement with NZ on the industry's behalf.

Did you know?

Root Rot Video Available

A QDPI research team has been investigating better methods of controlling avocado root rot for some years.

Its work on tree-rot diseases and the trees' responses has received international recognition.

The research has led to the development of a highly successful trunk-injection control method using phosphorous acid. This technique has been of immense benefit to Australian avocado growers.

Mr Roger Broadley, the producer of the video, said that the video entitled *Managing Phytophthora Root Rot in Avocados* covered all aspects of phytophthora root rot in avocados, including management by cultural, biological and chemical means.

It shows how to prevent trees being infected by the root rot fungus, how to minimise root rot, and how to rehabilitate sick trees using the latest research results.

This information is presented clearly, step by step. Mr Broadley said that experienced commercial growers who had seen the video had commented most favourably.

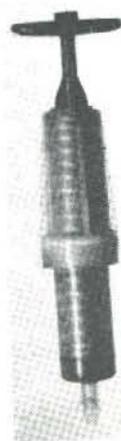
Managing Phytophthora Root Rot in Avocados runs for 24 minutes, is available in VHS and costs \$25 post free. It can be bought through QDPI Publications, GPO Box 46, Brisbane 4001 (Telephone (07) 239 3100) or from the QDPI Bookshop, Ground Floor, Primary Industries Building, 80 Ann Street Brisbane.

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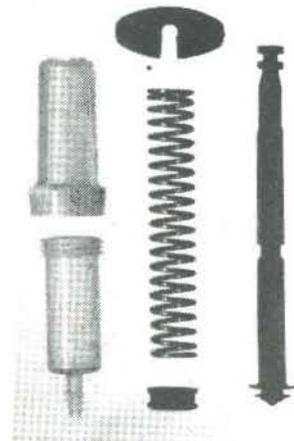
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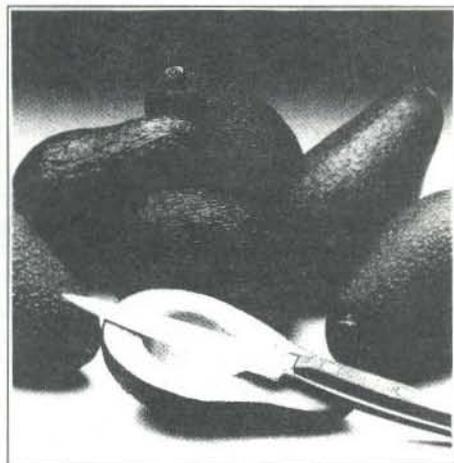
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Did you know? Marketing of Fosject Products

Fos-Ject@200, the leading systemic fungicide for the control of root rot in avocado trees, has joined the ranks of Du Pont horticultural products.

Fos-Ject@200 which is manufactured by UIM Agrochemicals (Aust) Pty Ltd will now be available through Du Pont's national distribution network

Fos-Ject@200 will be included in the company's research and development activities. "We have an extensive program of trial work which will enable us to investigate more efficient and effective use of the product" Dupont Horticultural Product Manger Mr Mark Christie said.

Existing and new users of Fos-Ject@200 will now have the support of the Du Pont advisory network, which includes field advisors and R&D experts to help them solve their disease and yield problems. UIM Agrochemicals will continue to provide technical support to Du Pont to ensure continuity of service.

Did you know?

Marion Matthews, President of the Sunraysia Avocado Growers Association is the winner of the Rural Development Section of the Young Achievers Award in Victoria. Marion has won \$5000 which she hopes to use to attend the World Avocado Congress in California next April if her many other commitments permit her to get away.

Marion has made tremendous contributions to the Sunraysia AGA in her capacity as President, as well as being Chairperson of the Promotions Sub-Committee and heading a number of promotions.

Marion is shown in this photograph leading a group discussion during the AAGF Conference 90 held in July. Congratulations Marion!





Inventing the Future

Members attending the recent Conference 90 were asked to help in the development of the avocado industry goals and research and extension priorities.

Speaking on the final day of the Conference on Queensland's Gold Coast, Don Lavers, a member of the Australian Avocado Growers' Federation (AAGF) Research Sub-Committee said that Federation members would be participating with leading researchers and extensionists in an avocado industry workshop within the next twelve months to identify items that needed the most urgent attention. The Research Sub-Committee has developed a programme with organisers and the QDPI, for the workshop to identify industry goals for the next 5 years, examine the obstacles to achieving these goals and point to the areas where research and extension can help to overcome these obstacles.

Mr Lavers quoted world renowned ecologist, geneticist and philosopher, David Suzuki, who wrote "the mind that emerged from the human brain presents us with the unique feature choice, by weighing the consequences and electing our actions we are capable of inventing the future."

It is time, said Mr Lavers, to marshal the enthusiasm that has been outstandingly evident at this conference and engage in our version of Inventing the Future.

During group discussions at the conference, a very positive attitude emerged and members welcomed a more professional attitude developing in the industry. Every member should look at the map, consider the route the industry should take and ask themselves are they prepared to travel down this road? This is the challenge. This is the Vision of the Future.

Factors to make a strong industry
To allow us to consider industry goals, the question must be asked, what factors are needed to make a strong avocado industry?

- Mr Lavers suggested they are:
- An expanding market...Domestic, export, processing
 - Viable growers...Growers making a profit and orchards yielding capital gain
 - Confidence in the future.

To achieve an expanding market we will require:

- A suitable product - notable for eye appeal, taste appeal, reliability, continuity, good shelf life and residue free. It should be available ripe as well as hard
- Good presentation - adequately packaged under a single brand (or a small number of brands) with stickers that are meaningful to consumers

- Correct marketing - taking into consideration the important P's - placement, prices, promotion and people.

For growers to maintain viability, they will require:

- Reliable productive varieties
- Smaller trees to enable ease of picking and pest control
- A high density orchard with canopy management skillfully employed
- Minimum pesticide use achieved through regular orchard monitoring
- Optimal labour utilisation - one of the growers' greatest costs
- Efficient irrigation, orchard nutrition
- Good business management
- Planning, setting goals, decision making.

Confidence in the future will be generated by growers secure in their viability. This will be augmented by responsible industry planning. We will need to:

- Set industry goals
- Rectify obstacles to achieving goals
- Examine the role of research in recovering these obstacles
- Examine the role of extension
- Enumerate research and extension priorities.

Mr Lavers presented delegates at Conference 90 with cards showing suggested industry goals and a number of areas of research and extension that may help towards achieving these goals. He invited everybody at the Conference to help map the direction the industry should take by placing a priority rating on industry goals and give a priority to areas of research and extension they believed were most important.

Readers of *Talking Avocados* can also add their voice to vision of the future.

Please fill out the insert and mail to Ross Boyle, The Secretary Australian Avocado Growers' Federation PO Box 19 Brisbane Market Qld 4106

Economical Avocado Grading

A determined avocado grower faced with ever increasing costs has cleverly designed a revolutionary concept in avocado grading.

The innovative grower, Bruce Goodrick, was faced with a dilemma. "I simply could not justify a high capital outlay on avocado grading machinery. With a few hundred trees what do you do? Simple - I designed my own and made a working prototype. The results were immediate."

The new grader is only 3m long, self feeds, polishes and sizes all in one machine. Can easily be operated by 1 or 2 people and has a capacity of something like 50 trays per hour.

Bruce says that "it was imperative that the avocados were presented in the best possible way, the avocado pack looked fine to me after being through the grader, but I wanted to make 100% sure. So I spoke to my agent and he said that they were polished and sized perfectly."

Following this, contact was made with P.S.F. Equipment to manufacture and market the grader. P.S.F. Equipment was chosen because of their incredible track record of success and reputation as reliable manufacturers of quality fruit grading machinery.

The new avocado grader, called the "AVOPACK", is best suited to the smaller grower who has that few hundred trees and is looking for a way to carry out his own packing at a realistic price.

Control Your Packing Costs

How avocados can be polished - sized - packed in the one operation with the new P.S.F. "AVOPACK".

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Stop the Rot: Mango Disease Research has a spin-off for Avocado Growers

Greg Johnson, Tony Cook, Andy Mead and Ian Wells, QDPI

Many of the fungi attacking tropical and sub-tropical fruit are not very fussy! The same fungi can attack many different types of fruit and those causing stem end rots of mangoes and avocados are no exception. Therefore, research currently being undertaken on the control of stem end rot of mangoes in Queensland crops is of considerable value to avocado growers. When anthracnose is well controlled, as is the case in most commercial orchards, stem end rot becomes the major cause of disease loss in mangoes and avocados.

The same fungi are primarily responsible for stem end rot of mango and avocado in both Australia and New Zealand. Work being undertaken on stem end rot control on avocados in New Zealand will also benefit Australian avocado growers.

In work with mangoes in which over 6 000 fruit were examined, we found that *Dothiorella dominicana* was the main cause of stem end rot in most orchards. Isolates of *Dothiorella* from mangoes can infect avocado and vice versa. A detailed survey of the causes of stem end rot in avocado would probably also reveal additional pathogens that have been recorded from avocados elsewhere.

Quality Assurance

Unfortunately, fruit affected by stem end rot cannot be culled at harvest as symptoms do not appear until ripening. Successful control of stem end rot will depend upon management practices to reduce infection and post-harvest disease development. Results from our mango work indicate that the following aspects need to be addressed.

Chemical Control

In mangoes, stem end rot can be reliably controlled by postharvest immersion of fruit in hot Benlate[®] (500 ppm, 52°C, 5 min). Sportak[®] (prochloraz) controls only 30-50% of stem end rot infections. Since avocados are more prone to heat damage than mangoes, hot water treatment is not an option. Currently, we recommend a prochloraz spray (*250 ppm/30 sec) for control of stem end rot and anthracnose on avocado.

Storage and Ripening Temperatures

It has been suggested that all other methods of disease control should be considered supplements to refrigeration. We currently recommend storage of avocados at 7°C and ripening at 16-20°C to take advantage of the effects of temperature on ripening and the development of anthracnose and

stem end rot. Similar practices may be applicable for mangoes. Our work has shown that cool storage (13°C) also delays ripening and the development of stem end rot in mangoes - the disease is seldom seen before 2 weeks at 13°C, whereas it can appear in 4 days at 22°C. In this case, avocado research has had a spin-off for mango growers.

Orchard Surveys

In mango orchards, higher levels of stem end rot are associated with older orchards, high leaf-litter and water-stressed sites. Stem end rot fungi also cause twig dieback, and can occur on the bark and dead twigs, providing sources of inoculum for stem end rot. Levels of stem end rot have been fairly stable in older orchards during three years of surveys. As well, similar levels of stem end rot developed in fruit from the same site, whether it was sampled early or late in the season. Of two newer orchards that had low stem end rot levels in year one of the survey, levels have remained low in fruit from the drier, cooler inland site, and have increased in the coastal, hotter site, where trees may sometimes be water stressed. These results suggest that growing conditions may influence disease build up.

Varieties

More than 90% of mangoes grown in Australia are the variety Kensington. A diversity of avocado varieties are grown in Australia and it is possible that some cultivars are more resistant to stem end rot. Israeli work has already shown Hass to be resistant to another stem end rot pathogen *Lasiodiplodia theobromae* and South African work showed Edranol to be resistant to *B. dothidea*.

When does infection occur?

Mangoes can be infected by the stem end rot fungi from flowering until harvest. However, our work at a site with a history of high stem end rot losses, suggested that infections by stem end rot fungi occurring in stem-end tissue up until 3 weeks after the start of flowering, caused fruitlet abortion. We were unable to detect further infections until 9 weeks after flowering when their incidence began to increase, with infection levels stabilising about 4 weeks before harvest. The most plausible explanation for this infection pattern is that later infections arose from the fungi colonising the mango stalk and moving down into the stem end between week 9 and harvest (we were sampling stem end tissue). Sampling both stem end and stalk

tissue during fruit development in the 1990 season will determine whether the infections are originating from the mango stalk.

If infections originate in the stalk, it may be possible to control the disease by delaying the conditions which favour tissue colonisation by the stem end rot fungi. On temperate trees which can develop dieback and stem cankers caused by *B. dothidea* (e.g. peaches), water stress and defoliation favour disease lesion expansion. Pre-harvest water management and maintaining adequate stored energy supplies may be the keys to controlling stem end rot in mangoes and avocados.

Because most of our avocados are grown in high rainfall districts and mature in the wet season, stem end rot may prove to be less prevalent than it is in Queensland mangoes, many of which mature in the dry weather of late spring and early summer. However, damage to the avocado tree root system by Phytophthora root rot increases water stress and reduces stored carbohydrate; these effects could encourage the spread of stem end rot.

Long term solutions

As well as using water management and crop husbandry practices it may be possible to use different fungi or bacteria to discourage the spread of the stem end rot fungi into the stem end of fruit. Some successes in the biological control of stem end rot on avocado have been reported from South Africa.

Another long term solution may be to infect trees with less aggressive strains of the stem end rot fungi to delay the spread of strains causing stem end rot. This method has shown promise in controlling chestnut blight, a serious disease of Chestnut trees caused by a similar pathogen (*Endothia parasitica*).

For the moment, our options for controlling stem end rot in avocado are: controlled ripening, good orchard husbandry and postharvest prochloraz sprays.

Acknowledgements

The mango research discussed here has been possible through the co-operation of Australian mango growers and funding from the COD and the Australian Centre for International Agricultural research (ACIAR).



Six Months in South Africa

Tony Whaley, Maroochy Horticultural Research Station, Qld.

Due to the constraints of time, my research effort in South Africa focused on short term projects where results could be produced within the 6 months available. The studies completed were:

1. Carbon dioxide assimilation of developing fruiting shoots of Hass avocado.
2. Gas exchange characteristics of developing avocado fruit (Fuerte and Hass).
3. Mineral uptake characteristics of Hass fruit from trees foliar sprayed with Cultar[®].

At first glance the above research may seem to have little relevance to the grower in terms of results that can be directly employed in the orchard. To some extent this is true. Research is often carried out to gain further understanding of basic mechanisms which in time can be interpreted into applied management strategies. However, I believe some of the results and interpretation from the above research satisfies both the curiosity of the scientist and the requirements of the orchardist.

CO₂ assimilation - What is the Relevance?

The study of carbon dioxide assimilation of developing fruit shoots of Hass avocado gives us an interpretation of results from research on the timing of injection of phosphonate fungicides (e.g. Fos-ject 200 and Alictte Ca[®]). I have been working on this project in Australia, with Ken Pegg (Plant Pathologist) and Phil Hargreaves (Agricultural Chemist) and it is currently in its final year.

After using potassium phosphonate, Fos-ject 200[®] (which is registered for Australia growers), for the last 3 years as a trunk injection for the control of *Phytophthora* root rot, our orchards are basically in a healthy state. However once the trees have been brought back into full production the questions to be answered are:

1. Do I need to continue injecting my trees? The answer to this is YES, as injection does not eliminate *Phytophthora* from the soil.
2. Since I need to retreat trees how often should it be done? The answer to this is UNKNOWN. However, we can make our 'best horticultural guess' and recommend that a maximum of once a year or a minimum of once every two years will maintain health and tree production - the frequency will largely depend on the disease pressures in the individual orchards.
3. What stage of the phenological growth cycle should I inject to gain maximum advantage from my retreatment

programme? Until recently UNKNOWN, but we now know that injection of healthy trees for protection against *Phytophthora* root rot should be given during late spring or summer when the trees are NOT actively growing i.e. not flushing (under Australian conditions the period of greatest disease pressure is during the late spring and summer when soil temperature and moisture are conducive to *Phytophthora* activity).

There is a very logical explanation for this recommendation based on the timing of injection phosphonate distribution studies coming to completion in Australia, and the carbon dioxide assimilation of developing fruiting shoots of cv. Hass avocado research that I was able to do whilst in South Africa. The integrated results from both studies are shown in Fig. 1.

On injection into the xylem (conducting tissue in the wood of the tree taking water from the roots to the leaves) phosphonate moves quickly to the leaves. Further translocation in the tree is dependent on movement through the phloem (tissue which moves photosynthates, i.e. the sugars produced in the leaves of the tree to the fruit, roots and other areas of the tree to provide energy and materials for growth). From the CO₂ assimilation research (fig. 1A) we see that for the growing shoots, this means that all growth requirements of these shoots (water and minerals through the xylem and sugars through the phloem) are being imported from the rest of the tree. In fact, for in excess of 40 days after bud break there are leaves on these shoots which are importing most of their requirements for growth. Thus phosphonate arriving in the leaves during this importing period faces extreme difficulties in moving out again (it can be compared to a fish attempting to swim against a strong current). This is clearly shown in Fig. 1B where the phosphonate concentration in the roots (1) 32 days after injection only reached 6 mg per kg. A minimum concentration for protection is known to be in excess of 20 mg per kg.

Sixty days after spring bud-break the shoots are fully mature and reach their maximum exporting capacity of photoassimilates. This is a period of root growth activity and high demand for photoassimilates or sugars from the leaves. Phosphonate from injections during this period rapidly moves out of the leaves with the mass flow of photoassimilates, and from the same injection rate we finish up with 5 times more phosphonate in the roots (2) (Fig. 1B). This concentration gives protection against *Phytophthora* root rot.

The pattern of distribution of phosphonate to the roots is consistent regardless of the time of injection. Our data (not presented

here) shows that the maximum concentration of phosphonate to accumulate in the roots occurred about 40 days after injection after which the level slowly declined. This is supportive of the results of Botha et al. and Schutte et al reported in the *South African Avocado Growers Yrbk* (1988) 11, 29-34. We have produced the same results from injection timing studies in two successive years and have a rational explanation via assimilate movement for the changing dynamics of translocation. The technology is now yours to apply intelligently using injectable phosphorous acid protection of your trees.

Gas Exchange - Explaining Varietal Differences

The study of gas exchange characteristics of developing avocado fruit (Fuerte and Hass) may also seem remote from the front line of farming. After all what do you care about transpiration, respiration and photosynthetic rates of fruit? With the results standing alone you would be quite correct with your assumption that this research is of academic interest only. However I believe we have results which can assist in decision making at the farm level. This research was done with Michael Blanke, University of Bonn West Germany, visiting CSFRI on a Research Fellowship during November and December 1989.

Briefly, we found that developing Hass fruit have a higher respiration rate than similar Fuerte fruit. Respiration produces carbon dioxide, both from the growth processes occurring in the plant and the maintenance of life within the tissues resulting in a loss of carbon from the tree i.e. the consumption of energy which produces CO₂ as a by-product. Respiration is also a function of temperature, and the higher the temperature the faster the rate of respiration. Hence cv Hass fruit have a higher energy requirement for growth than cv Fuerte fruit. Not only do they have a higher respiration rate when growing but they are on the tree for a longer period. This result ties in nicely with previously published information suggesting 'Hass' trees having a higher water and nutritional requirement than 'Fuerte' trees. In other words 'Hass' trees require additional resources to cope with the higher energy costs of fruiting.

We can also use these results to offer an explanation of the small fruit phenomenon of 'Hass' seen in Australia and possibly in South Africa, i.e. the warmer the growing conditions the greater the problem of small fruit. As respiration is directly related to temperature we suggest that under high mean night temperature conditions there is less energy available for productive growth and we finish up with many small fruits. Of course our result is only a small part of the total picture which is gradually built up by additional research, e.g. the development of phosphonate technology. However,



this result strengthens our position on recommendations on where to grow 'Hass' and provides basic information for further research into the problem.

The above gives you some insight into the research that I did in South Africa during 6 months and results and interpretations from the remaining projects will be published for your information in the near future.

In conclusion, I would like to echo the sentiments expressed by the South African Committee Chairman, Prof Jan Kotze. Transshipment technology is making rapid advances bringing distant markets into the range of an increasing number of competitors. To retain or increase your market share you must remain competitive. This largely comes by remaining at the forefront of technology,

i.e. 'research is the key to survival.' South Africa can be justly proud of its achievements in avocado research as in many areas it is leading the world. However, the weakest link in any research programme is the accurate interpretation and development of results into useful management strategies at the farm level. Most scientists make poor farm managers and many fail to meet the expectations of their clients, even though their science is sound and they have survived the scrutiny of their peers. Many of us work in narrow disciplines obsessed with meeting the statistical parameters demanded by our profession of proving our results correct at least 95 times in 100. We often fail to appreciate the significance, or insignificance of our results and how they may alter other aspects in the management

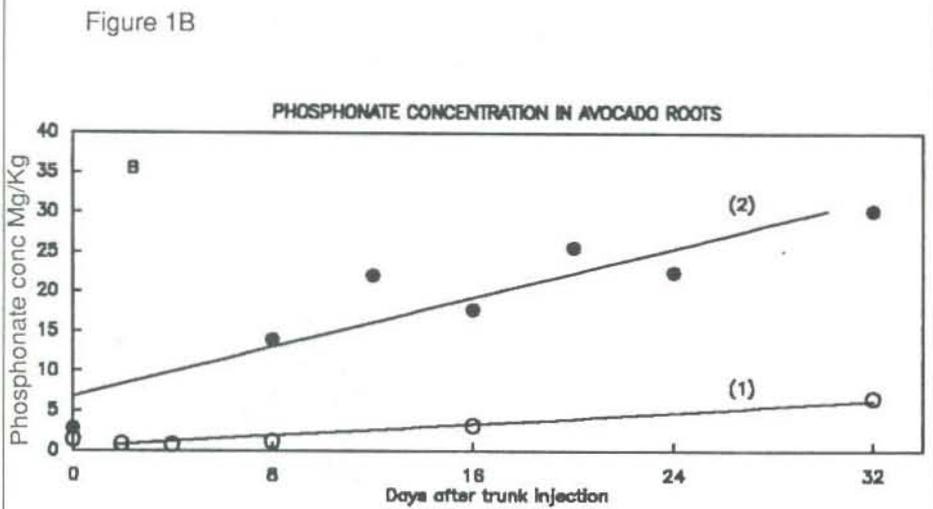
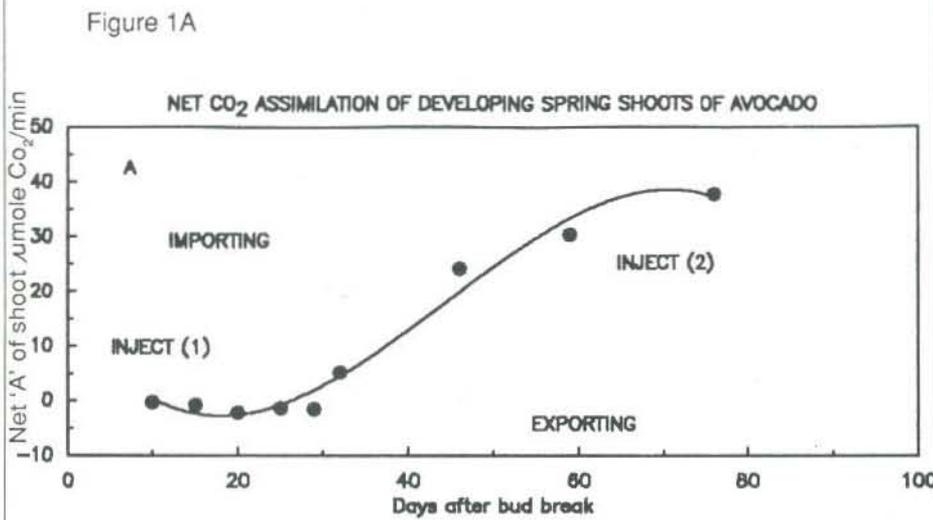
of a total crop system.

South Africa has a volume of production research results coming forward. It is often left to the grower and his extension officer to interpret these results in the context of how they can be best applied to an individual farm situation. Sometimes the change in one management input will call for modifications in other management areas before the full potential of the new technology is realised. Remember, the tree is a complex unit and to manage it successfully a totally integrated package drawing on all available research is required. I leave this challenge to you.

Now I'm satisfied that you didn't have any time left to become a 'lion tamer'.

Editor

Figure 1. The relationship between nett carbon assimilation of developing shoots, time of injection and phosphonate concentrations in the roots of avocado trees.



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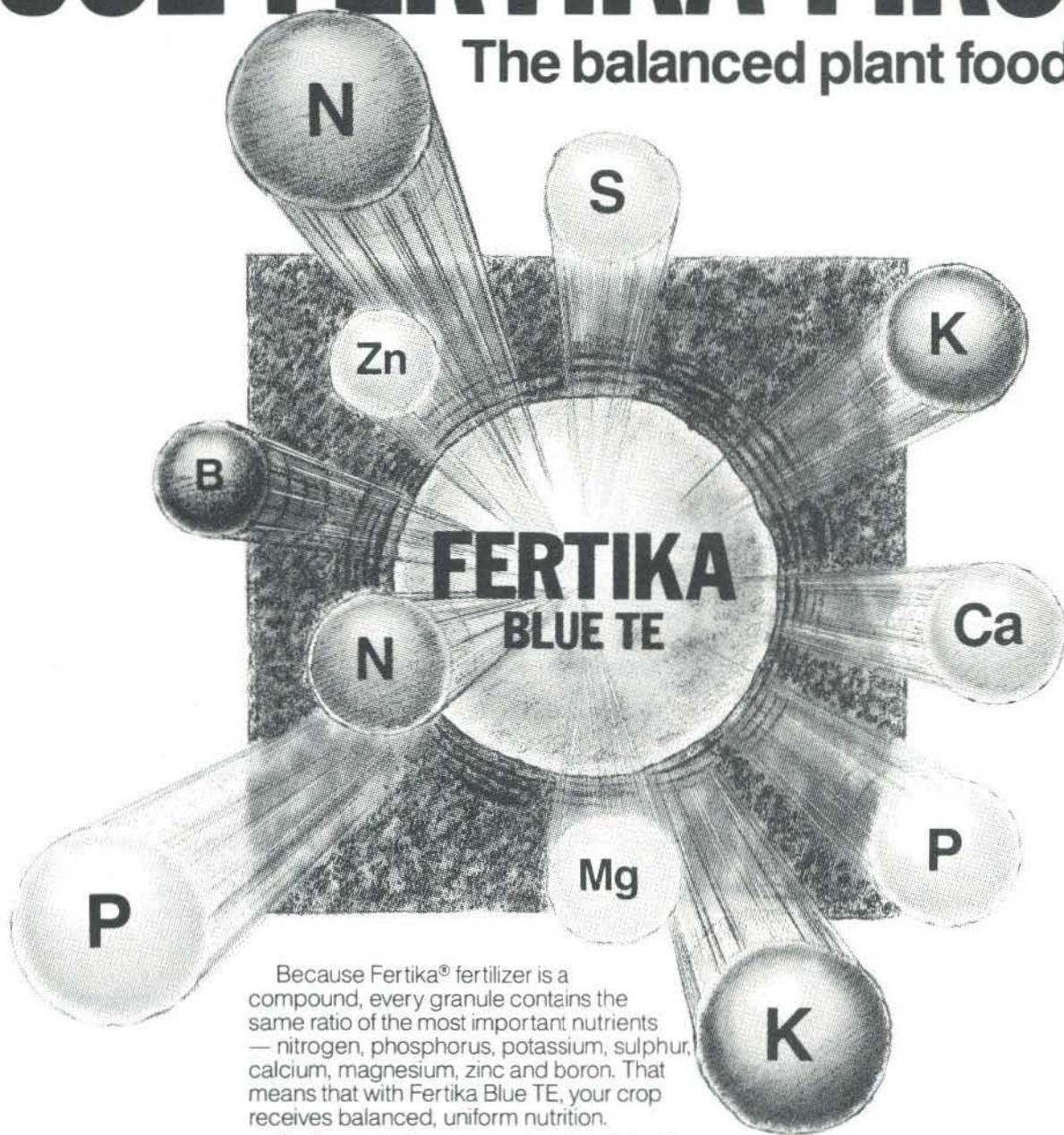
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