AUSTRALIAN AVOCADO GROWERS' FEDERATION INC

# Talking Avocados

- The Australian Newsline
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November/December 1991

# IRRIGATING AVOCADOS

# - BALANCE IS THE ANSWER...

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It is vital to realise that maintaining optimum water status for avocados is not just a matter of turning sprinklers on and off. You must measure the water requirements of trees - DON'T GUESS.

Supplement irrigation and natural rainfall by sound management to reduce water loss and maintain soil moisture.

**Total Water Management Involves:-**

- **selection of the best suited irrigation system**
- **mulching**
- **weed control under trees**
- **use of tensiometers**
- **windbreaks**
- **watering to suit the stage of the crop cycle and weather conditions**

The avocado is extremely sensitive to waterlogged conditions due to the high oxygen requirements of its roots. Waterlogging stops root growth and eventually causes death of roots.

Prolonged saturated soil conditions are ideal for root invasion and destruction by the root rot fungus, Phytophthora.

Overwatering also means waste of stored water and unnecessary costs of running the irrigation system.

As well, avocados are very sensitive to drought stress, especially during flowering and fruit set, leaf and fruit development under high temperatures.

Water requirements will vary with weather conditions, soil types, tree age and crop load. The water needs of the avocado are closely related to the stage of the crop cycle (Figure 1).

To avoid underwatering or overwatering accurate scheduling and application of water are essential.

**Water Supply**

Sites with low or erratic rainfall are not a problem provided supplementary irrigation is available. Avocados are sensitive to saline conditions in the soil which can be caused by using saline irrigation water. Yield is reduced if the total soluble salt (TSS) concentration of the irrigation water is greater than 580 µS/cm. Some rootstock are more tolerant than others to saline irrigation water.

As an example, an area with an average annual rainfall of 1500 mm (60 inches) would need a water reserve of around 5 megalitres per hectare of mature trees to avoid yield decreases in a dry year.

**Selecting An Irrigation System**

Healthy avocado trees have a dense mat of shallow feeder roots that take up the majority of the trees water and nutrients. In selecting an irrigation system it is vital to water the entire ground area under the tree, to prevent drying out of these vital feeder roots.

While one sprinkler per tree will adequately wet small trees up to four metres canopy diameter, larger trees will require two microsprinklers to give complete wetting. Such flexibility can

be achieved by using compensated sprinklers or by dividing the output from one sprinkler between two smaller performance sprinklers. This maintains the hydraulic balance of the design.

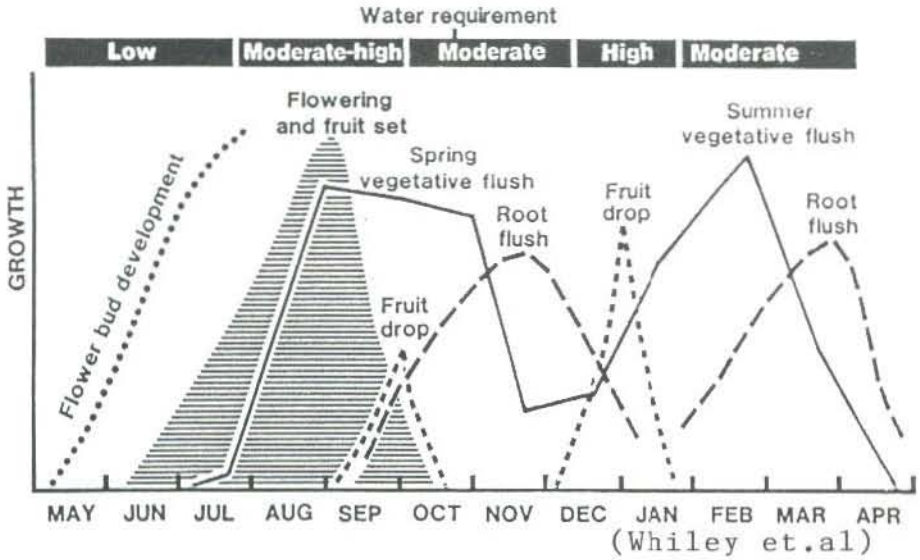
The recommended irrigation system for avocados is undertree microsprinklers. Table 1 gives a comparison of irrigation systems available and their suitability to avocados.

**Effect of Water Stress**

Lack of water will cause a number of symptoms:-

- fruit drop and smaller fruit at maturity (especially in Hass)
- ring necking of fruit
- drying out of feeder roots which will appear brown and desiccated instead of white and moist
- trees will close their stomata (breathing pores) to prevent water loss through leaves. Closure of stomata results in reduced photosynthesis and slowing down of normal tree functions.
- poor vegetative growth and a slower build-up of carbohydrate stores in trees for the following season.

**Figure 1. The Growth Cycle and Water Requirements.**



(Whiley et.al)

**Water Requirements and the Crop Cycle**

Emphasis in the first two years should be on growing a healthy tree.

Water stress during the spring and summer will hold back vegetative growth, resulting in a slower increase in tree size and the potential crop that can be carried.

Once trees begin bearing commercial crops in the third or fourth year, irrigation should be varied to suit the stages of crop growth as shown in Figure 1.

**How Often Should I Water? How Much?**

Tensiometers are the most reliable, practical method that avocado growers can use to assess the water status of the soil. A new device called the 'Enviroscan' may be even better to use. More information on that device will be available as it is trialled. At present tensiometers are the major tool in deciding when to irrigate.

- Place tensiometers about 0.5 meters in from the dripline. At each site, one should be installed at a depth of 45cm. Position tensiometers about 30cm apart.
- Initially only one pair of tensiometers are necessary in a block of avocados provided the soil type is constant.
- Irrigate when the reading on the dial of either tensiometer is around 30 centibars (cb) in loams and around 40 cb in clay loams. Stop irrigating when the needle drops to between 0 and 10 cb.
- Where water use is high under hot dry conditions irrigate when the reading on the dial of either tensiometer is around 25 cb. Tensiometer readings will indicate the need for irrigation more frequently than where mild conditions prevail.

**It Is Not Good Management to Irrigate on a Weekly Schedule -**

Weather conditions and crop requirements are not static. Tensiometers are good insurance against underwatering, wasting water, overwetting the root system and yield reductions.

The cost of tensiometers ($80 - $85 each and two per block) is quickly repaid by less water stress and resultant increased yields (eg. only 30 - 35 extra trays per block at $5 per tray clear to the grower) will justify buying tensiometers.

**Guideline Rates**

The following recommended rates are intended as a start for growers formulating an effective irrigation programme for avocados. They should be used in conjunction with tensiometers and thereby adjusted to suit the site, the crop load and the weather.

**Before Planting**

The irrigation system should be installed prior to planting trees. Irrigate tree sites (about 200 litres per site) one or two days before planting so the soil is moist at planting. Undertree microsprinklers should be used in microspray mode (if available) to concentrate water at the tree site.

**Establishment**

Immediately after planting, commence irrigating with 40 - 50 litres/tree/week. The root ball of newly planted trees is very susceptible to drying out. Newly planted trees need 'wetting' every one to two days.

Regularly check soil in the original potting mix to make sure it is moist. If early morning wilting occurs, apply a heavy watering, (100 litres) then return to the normal 40 - 50 litres/tree/week.

About two months after planting increase the rate to 50 - 70 litres/tree/week.

**Bearing Trees**

Do not apply heavy irrigations during the rest phase prior to flowering. This mild stress will help to induce flowering. Table 2 outlines the amount of water you could apply to bearing trees. Adjust rates according to soil conditions and plant requirements as indicated by tensiometers.

The total amount applied is not necessarily applied in one application per week. The number of irrigations required to put on the total amount will vary according to soil type and delivery rate of the irrigation system. Sands and sandy loams require more frequent watering as surface feeder roots dry out more rapidly than when in clay loams (Table 3). Low output emitters must be run for longer and/or more frequently than high output emitters.

As tree size increases microsprinklers should be changed from microspray mode to sprinkler mode so that more of the expanding root area is watered.

In large trees it is desirable to move to two or more sprinklers per tree to maintain maximum wetting of the total root area.

**Mulching**

Ensure that young and bearing trees are kept mulched. If mulch was applied during the site preparation, extra mulch may be needed after planting. Do not mulch young trees before or during the first winter if frost is a potential problem. Mulch conserves moisture, suppresses weeds and encourages feeder root growth. Surface feeder roots absorb the majority of the trees water and nutrients.

Mulching helps prevent water stress by keeping roots cool and moist during hot dry conditions.

Trees are mulched to about 0.5m beyond the canopy edge with materials such as straw or stubble if natural leaf litter or feeder roots are sparse. Mulches should not be placed too close to trunks as this may cause collar rots.

**Mounds**

Where extra depth of soil is needed to grow avocados mounds are sometimes constructed. Mounds tend to dry out faster than where trees are planted on flat soil surfaces. Irrigation rates must be adjusted accordingly. A guide is to increase rates by 20 to 30%. Use tensiometers as a guide.

**Phytophthora Root Rot**

Phytophthora affected trees have reduced tree vigour and yield potential. Functional leaf area and roots are diminished and subsequently the water taken up and required by sick trees is less. The amount and frequency of water applied should be reduced where trees are lacking feeder roots and vigour. Tensiometers placed under sick trees will show this reduced water uptake.

**Shelter**

Avocados must be well sheltered from strong prevailing winds. Shelter is needed to prevent excessive water loss from foliage under windy conditions, and to increase humidity in the block.

Windbreaks prevent battering and drying out of branches, foliage, flowers and fruit. Effective windbreaks should be established well before young trees are planted out.

Trees need individual tree guards from planting. Windbreaks may be grown or constructed from timber and semi-permanent synthetic materials.

Living tree windbreaks cost very little to establish and provide wind protection for a distance up to 10 times their height. Problems with living windbreaks include root competition, excessive use of space, gaps in the shelter belt due to plant death or breakage, and harbouring of pests and diseases.

When installing irrigation, it is advantageous to also irrigate windbreak trees. This achieves better growth rates, prevents leaf drop in times of drought and provides earlier protection of the orchard.

In order to be effective, windbreaks need to be at right angles to prevailing wind and if trees are used, they must retain leaves and branches from the ground up.

Instant shelter can be obtained be erecting artificial windbreaks. These are effective but expensive and not widely used in orchards.

**Remember, water management is water at the right time in the correct quantities and all possible means of reducing tree water stress during flowering and fruit development.**

## New Zealand Tour 1993

The Australian Avocado Grower's Association is considering conducting a Grower's Tour to New Zealand in 1993. Please contact Ross Boyle on (07) 379 0228 if you are interested or want more details.

Table 1. Irrigation Systems and Their Suitability to Avocados

| System Type | Normal Layout | Efficiency of Water use | Soil Type | Wind Interference | Filtration Required | Capital Cost* per ha | Comments |
|---|---|---|---|---|---|---|---|
| Undertree micro-sprinkler (eg. Waterbird) | One Emitter placed centrally on young trees applying 80 - 120 l/hour. Two or more placed on larger trees to wet the entire soil surface under the tree. | 80 - 90% | Can be used in all soil types. | Moderate | 100 mesh | $2 400 - $3 500 | -RECOMMENDED as feeder roots are watered<br>-fertiliser can be applied evenly through system<br>-flexible system for young or old trees<br>-salinity effects minimised |
| Trickle (eg. Netafim Buttons) | Four to six emitters placed in a circle around the tree applying 8 l/hr each. | 95 - 100% | Only small portion of root area wetted in well drained soils. | Low | 140 mesh sand/ filters may be required with dirty water. Chlorination for iron bacteria usually required. | $1 200 - $1 800 | -NOT RECOMMENDED for avocados due to very inadequate wetting of all feeder roots. |
| Overhead (eg. Monsoon) | Sprinklers spaced at 60% of 'quoted' wetted diameter to give uniform application of 4-8mm/hr. | 60 - 70% | Best suited to high infiltration soils - sands and sandy loams. | High | nil | $6 500 - $10 000 | -NOT RECOMMENDED for avocados<br>-entire root area is watered but pesticide sprays are washed off foliage<br>-moisture promotes fruit rots and fungal growth on foliage. |

* Approximate cost only.

**Table 2. Some estimates of irrigation rates required by avocados (litres/tree/week)**

| TREE AGE FROM PLANTING | HOT DRY | AVERAGE SUMMER | SPRING | AUTUMN | WINTER |
|---|---|---|---|---|---|
| 1-2 (non-bearing) | 475 | 400 | 330 | 250 | 200 |
| 3-6 | 625 | 525 | 450 | 200 | 200 |
| 6-9 | 1250 | 1050 | 850 | 420 | 300 |
| 9+ | 2500 | 2100 | 1700 | 840 | 600 |

**Table 3. The frequency of irrigation in the absence of rainfall (days)**

| SEASON | SAND | SANDY LOAM | LOAM | CLAY |
|---|---|---|---|---|
| Summer | 2-3 | 3-5 | 7 | 7 |
| Winter | 7 | 10 | 14 | 14 |

# 'Hass' - Past, Present and Future

By AW Whiley, Principal Horticulturist, Maroochy HRS, QDPI, Nambour

While delegates at the recent Avocado World Congress in California deliberated over the 'Shape of Things to Come' it became very obvious that the past, present and foreseeable future, avocado production at the international level has and will be dominated by 'Hass'. The cultivars of the future will be judged against this standard. Markets in developed countries are becoming increasingly 'Hass' driven though some exceptions still exist, eg. France and Melbourne still prefer green pear-shaped cultivars. However, it is expected that these enclaves will eventually see the collective wisdom of the majority and accept the superior quality that this cultivar consistently delivers.

**'Hass' attributes**

There are several factors which have made 'Hass' the 'King of Cultivars' although they were not immediately recognised by the 'fathers' of this variety. 'Hass' has an "A" type flower pattern which is less sensitive to temperatures during flowering. This results in more constant fruit set over a wide range of environments when compared with those cultivars with "B" flower patterns eg. 'Fuerte', 'Edranol', 'Shepard' and 'Sharwil'. The thicker skin is less susceptible to fruit disease and damage from insects and wind. It transports better than most other cultivars, having greater resistance to flesh break-down and giving more reliable quality to the purchaser. When ripening the skin changes from green to black, masking minor rind imperfections and offering an easy index for the consumer to judge when to prepare the fruit for eating.

**The Origin of 'Hass'**

Extracted from 'Original Hass Mother Tree' (1991), a world Avocado Congress II publication....."The original tree was really a mistake - a lucky chance seedling. In the late 1920's, Mr Rudolph Hass, who was a postman, purchased seedling trees from A.R. Rideout of Whitter, for the purpose of developing a hectare of budded trees of the 'Lyon' variety. It was Rideout's custom to plant very small seedlings at an orchard spacing of 3.5 x 3.3m at the grove site. The seedlings were grown in 50 x 50 x 200mm tarpaper open-ended tubes of square cross sections. The seedlings were to grow in place for a year, or until well established, and then later budded in the field.

Hass' children first bought the tree to his attention. They preferred the fruit. Since the quality was high and the tree bore well, 'Hass' patented it in 1935. The same year he ordered 300 trees propagated to this variety by H. H. Brokaw of Whitter. Hass never planted the ordered trees; however, he entered into an agreement that Brokaw grow and promote the variety in consideration of splitting gross tree income 25% for Hass and 75% for Brokaw.

That wasn't an easy decision in those days since the 'Hass' fruit differed so dramatically from the 'Fuerte', which was the standard of the industry. Nonetheless, Brokaw began to propagate the rough, black Hass exclusively and promote it in favour of the then standard varieties. He and 'Hass' felt just as justified in-as-much as the 'Hass' was a far better bearer than the 'Fuerte' and matured at a different time of the year. Because of the seasonal advantage Brokaw was successful to the point of yearly sellouts of his nursery crops of 3 000 to 10 000 trees. Selling price was $5.00 per tree and against ('Fuerte' tree) prices varying from $3.50 in good years down to $1.25 in poor ones.

The 'Hass' was at first thought to be an upright-growing variety since it was found crowded among other upright growing seedlings. Its season was advertised being from May to November, even in the La Habra and the Whittier areas. Brokaw maintains that this was so, just as the 'Fuerte' commonly held until June in those days. He blames smog for earlier seasons in all varieties.

Despite speculation of the contrary, nobody knows what variety of seed produced the 'Hass'. Rideout was an innovator and pioneer in avocados and used whatever seeds he could find - many times planting them along streets or in the neighbour's yards in search for new varieties. Ironically, the 'Hass' was one he hadn't intended to leave as a seedling.....

All countries with delegates at the World avocado Congress in California (April 1991) received a gift of a 'Hass' tree propagated directly from the parent 'Hass'. I was able to bring this tree back with me and place it in plant quarantine. As we have seen some divergence of type in the Australian 'Hass' variety, the importation of this material will re-establish the 'Hass' standard.

**'Hass' around the world**

In the last 40 years 'Hass' has colonised the avocado growing world. Apart for accounting for about 80% of the California production it has become the most important cultivar in Mexico, Chile, Spain and New Zealand. 'Hass' also has an important position in Israel while in South Africa production from 'Fuerte' is still greater but recent plantings are strongly favouring 'Hass'. Recent figures from the ANVAS nursery survey in Australia showed that 'Hass' accounted for 62.2% of trees planted in 1990. The second most popular variety was 'Fuerte' which only accounted for 10.2% of the total number sold.

**The Future**

We can expect 'Hass' to remain a dominant force in world production for some time to come. There is no doubt that a less vigorous and more productive cultivar would be welcomed by industry however, the only prospect in sight is 'Gwen', from the breeding program of Dr. Bob Bergh in California. 'Gwen' shows a lot of desirable horticultural features such as precocity, semi-dwarf growth and high productivity for the size of the tree.
With our comparative evaluation up to four years from planting 'Gwen' fruit has been about 8% larger than 'Hass'. At years 3 and 4 from planting, the 'Gwen' trees are about one third the size of 'Hass'. When judged on a fruiting efficiency basis, the 'Gwen' variety compared to 'Hass' has produced about four times the weight of fruit per cubic metre of canopy in the third year after planting and twice the weight of fruit per cubic metre of canopy in the fourth year. It matures about 4 weeks later than 'Hass' but the times of harvest run into each other. In south east Queensland 'Gwen' fruit must reach at least 25% dry matter before harvesting otherwise they will shrivel during ripening. The fruit remains green when eating-ripe. To date this has been its major downfall in California where consumers are paying a premium for black 'Hass'. The Californian breeding program has a new generation of progeny beginning to fruit bringing renewed optimism that new cultivators superior to 'Hass' may emerge. A line identified by its field site as Bob Lamb 122 has similarities to 'Hass' as far as fruit shape, size and colour are concerned but productivity and tree vigour still have to be evaluated.

**Figure 1.**
The original 'Hass' tree (about 63 years old) now growing in suburbia. Delegates on the post-Congress tour at the recent World Avocado Congress visited this Historical site.

**Figure 2.**
The 'freeze' conditions in California during last winter were the worst in the last 100 years. Severe damage to trees occurred in many orchards. Pictured below, 'Hass' trees were severely defoliated with the death of smaller limbs while 'bacon' trees alongside were barely damaged by the cold conditions.

# Fruitspotting Bugs

By Geoff Waite, Principal Entomologist
Maroochy Horticultural Research Station

Fruitspotting bugs are probably the major pest of tree, fruit and vine crops grown on the coastal and bordering mountain ranges of Queensland and northern New South Wales. Their feeding causes damage to terminals, flowers and fruit and they are active for the major part of the year.

The pest species with which we have had to contend are *Amblypelta nitida* and *Amblypelta lutescens*. In northern NSW, records show that only *A. nitida* is present, but further collecting may turn up *A. lutescens* as it has been more common in the Sunshine Coast area in recent years. Between Brisbane and Bundaberg, both species occur but *A. nitida* is generally more prevalent while from Bundaberg north to Cape York, *A. lutescens* is the main species with *A. nitida* having a patchy distribution through to Iron Range.

Although this distribution of species may seem to be academic, it does have some bearing on which crops might be attacked eg. spotting bug damage to papaws, mangoes and custard apples is generally caused by *A. lutescens*. Related species in the Torres Strait and South-Sea Islands damage cassava and coconuts. There are also many crops which are attacked by both eg. avocados, lychees and guavas.

The natural habitat of fruitspotting bugs is generally considered to be rainforest or wet sclerophyll forest.

However bugs have been collected from other types of habitat including the Carnarvon Gorge. Despite attempts over many years to identify wild hosts, very little is known of them. It seems that in addition to many wild fruits, eucalypt tips could be important since I have found they feed willingly on these in my laboratory colony. Lantana is often quoted by growers as being a source of bugs but I have never seen bugs on this host.

As most of you will know, adult bugs are very well camouflaged and are difficult to find on trees. Generally, the only indication they are present or have paid a visit, is the damage they leave. The adults are yellow-green to brownish in colour and are about 13mm long. They are strong fliers and infest orchards by flying in from surrounding scrub, unsprayed backyard trees or other orchards. They are particularly fond of green fruit, more so than mature fruit. In some crops, the damaged fruit will fall eg. lychees, longans and macadamia. In others, it will stay on the tree but develop large lesions and craters eg. avocados, custard apples and guavas.

The adult bug takes up residence in a tree (often the same tree or branches suffer badly every year) feed, mate and lay eggs. The eggs are stuck to leaves or fruit, singly. They are opalescent green, about 1.5mm long and are extremely difficult to find on a tree. Depending on temperatures, they hatch in about 7 - 10 days. The first of the five immature stages or nymphs is green and black in both species but when they moult to the next stage, the nymphs of *A. nitida* are orange in colour while *A. lutescens* nymphs are a combination of white, pale green and orange with two prominent black spots on their back, which are the odour glands. In the adult, these glands are situated in the thorax and emit a foul-smelling odour when the bugs are disturbed. The period from egg to adult takes about 6 weeks and there are probably about five overlapping generations a year.

The period of activity extends from late winter-early spring to late autumn ie. August-September to May depending on how early spring is and how late winter sets in. The winter period is spent by adults generally on wild hosts but also in orchard trees. When the weather starts to warm up in spring, they fly into the orchards and feed on young fruit. Severe damage can be inflicted at this time but January - February is often the period when orchards, particularly avocados, suffer most since numbers have multiplied through a couple of generations by then and even though many will have been killed by sprays, a continuous immigration occurs from outside breeding areas. As mentioned earlier, the range of hosts is wide and hosts are not restricted to orchard crops.

From our records, it seems that *A. lutescens* has a wider host range than *A. nitida* because it feeds on terminals and shoots as well as fruit. Consequently, many garden plants such as frangipanni and mock orange are attacked. Table 1 shows the range of hosts recorded for *A. lutescens*.

Although they are relatively easy to kill with insecticides, control of fruitspotting bugs if often difficult. Orchards which are situated close to breeding areas are subject to continuous infestations which inflict severe damage. In some avocado orchards, even weekly sprays have not been able to keep damage below 20% and in the Sunshine Coast area at least two growers have given up growing avocados because of this.

Endosulfan gives good control if it is applied frequently. This chemical is preferred for use against bugs because it allows natural enemies particularly of scales and mites to survive reasonably well. Other chemicals may also give good bug control eg. pyrethroids but these chemicals tend to cause scale and mite problems which then require extra sprays to control them.

Because of the elusive nature of spotting bugs and their excellent camouflage, it is generally impossible to monitor for their presence. The past history of your orchard is probably the best guide as to the frequency of sprays necessary to obtain control. However, the appearance of obvious damage symptoms on fruit fallen naturally indicates that a spray may be necessary.

Ideally, we would like to be able to control these pests by biological means. Unfortunately, I have recorded only a couple of natural enemies, none of which is very effective although spiders do kill quite a few. The pheromone research is continuing although we do not have a final blend of chemicals tested yet.

We do know four of the six components of the *A. lutescens* pheromone and will probably test these anyway. The remaining two unidentified components may not be critical. As well as the pheromone work we are initiating studies on the chemicals which the host plants emit and which we think may attract the bugs.

Spotting bugs will continue to be a major pest of tree crops and it seems that virtually every new exotic crop introduced is a potential host. As growers you need to recognise the problem and the damage symptoms and take the necessary steps to apply sprays at intervals which give a level of control acceptable to your expectations and philosophy with respect to the use of chemicals generally.

* * * * *

**Table 1. Some hosts of *Amblypelta lutescens***

| | | |
|---|---|---|
| avocado | pecan | beans |
| lychee | granadilla | macadamia |
| papaw | longan | Eucalyptus trees |
| custard apple | carambola | white cedar |
| mulberry | sapote | cotton |
| banana | fig | nöogoora burr |
| guava | peach | Stephania spp |
| passionfruit | acerola | Anthurium spp |
| kiwifruit | grewia | Hibiscus spp |
| mango | cassava | Umbrella tree |
| cashew | frangipanni | citrus |
| mock orange | *Bauhinia galpinii* | camelia |
| feijoa | pomegranate | Eugenia spp |

# A Final Note!

As 1991 draws to a close, I'd like to wish Talking Avocados subscribers season's greetings and a prosperous new year!

The AAGF has joined the Australian Horticultural Corporation and I will be handing over the role of 'compiling' and editing the newsletter to the Corporation.

In leaving this position I would like to thank the authors who have made the effort to contribute to the Newsline. The industry will always benefit by the dissemination of 'good information'.

We must never stop learning and improving our quality, efficiency and market strategies. My wish for the future is that consumers will always buy 'good-looking' avocados that taste great, too. When that happens, then we have **really** achieved something.

Marie Piccone
Editor

PS. All future enquiries and subscriptions etc. re: Talking Avocados should be directed to:
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*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.*

# The Mite Eating Ladybird - A Very Effective Natural Predator of Mites

By Bruno Pinese, Entomologist, Queensland Department Primary Industries, Mareeba, North Queensland.

Tea red spider mites are usually not a problem to avocado growers thanks largely to a small and often unseen beetle. Adults and larvae of the Stethorus or mite eating ladybird feed voraciously on all stages of the mite. The small (about 1 mm across) jet black adult, its pink-grey larvae and black torpedo shaped pupae are normally found where mites are present. The pupae are the most obvious since they are usually found clustered near the leaf midrib and the pupal skin remains attached to the leaf after the adult has emerged.

If chemicals are used that do not kill off Stethorus, a natural balance between the beetle and the mites will be established. In a balanced system the predator will keep the mites in check and these will rarely reach damaging levels (Situation A in Fig. 1). The overuse of chemicals or the use of broad spectrum insecticides will destroy Stethorus and in this situation mites will "flare-up" causing damage (Situation C in Fig. 1). A typical predator/mite situation is shown in Figure 1.

**Situation A.** A desirable natural balance - mites and predator numbers fluctuate; the mite numbers are below the level of economic importance (Economic Injury Level - E.I.L.)

**Situation B.** Chemical is used which gives knockdown of mites but also kills Stethorus.

**Situation C.** Without natural control from Stethorus, mites build up quickly and exceed the E.I.L. causing damage and requiring further treatments.

**Situation D.** Stethorus starts to increase again but at a slow rate.

At present we do not have specific data on the impact on Stethorus of insecticides used in avocado, but from past experience the chemicals in use can be divided into 3 groups based on the expected level of impact on Stethorus.

**Group 1** Minimal/no impact - can be used (Trade names)
Mineral oil (Lo-Vis Oil & Various)
Copper oxychloride (Cuprox)
fenbutatin oxide (Torque)
Yeast autolysate+chlorpyrifos bait (Q Fly Lure + Lorsban)

**Group 2** Medium impact (use with care)
endosulfan (Thiodan, Endosan)
dimethoate (Rogor, Roxion)
chlorpyrifos (Lorsban)

**Group 3** High impact (do not use or restrict use to one application per season)
carbaryl (Carbaryl, Sevin, Bugmaster)
Synthetic pyrethroids - examples are Sumicidin and Ambush.

To ensure that Stethorus (and other beneficials) survive, chemicals from group 1 should be used whenever possible. Those in group 2 should only be used when there are no alternatives and then only if required. Those in group 3 should be avoided.

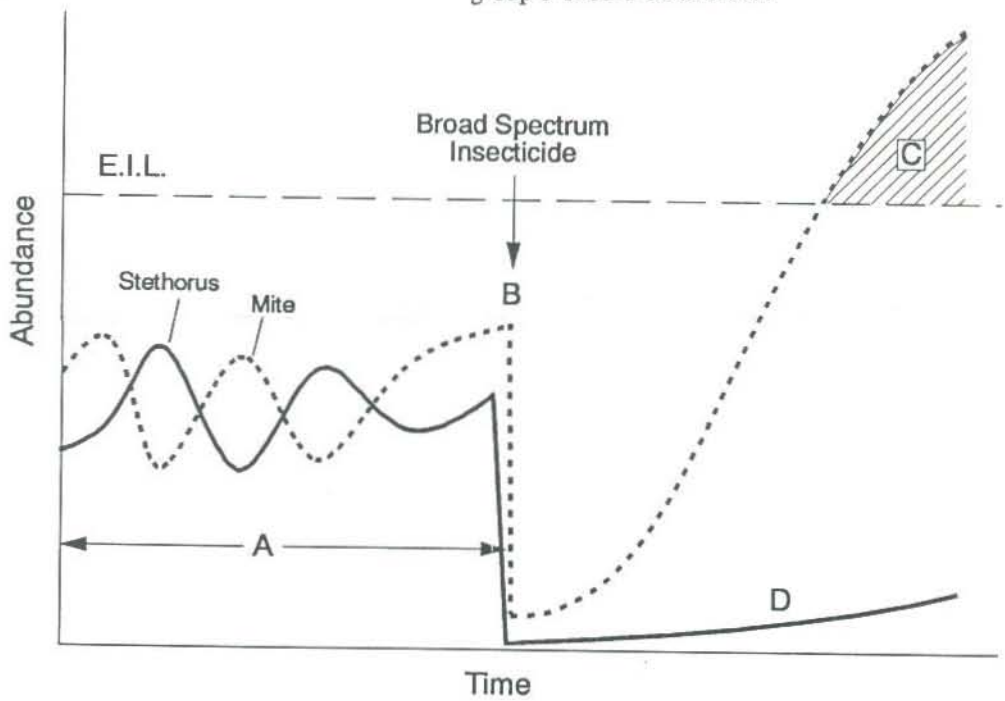


**Fig. 1:** Graphical representation of a predator (Stethorus) and prey (tea red spider mite) population trends and the impact of chemical use.

# The Introduction of Avocado Research Levies and Export Charges

By Orf Bartrop, Secretary, NSW Avocado Association Inc.

The Australian Avocado Growers' Federation (AAGF) has for some time been seeking to participate in a levy scheme to fund research and development for the avocado industry under the aegis of the Horticultural Research & Development Corporation (HRDC).

The need for this stems from an erratic scheme that has been in operation for many years where each state funds research completely independent of other states and therefore, research has tended to be haphazard, unco-ordinated and devoid of a priority system. Also, research has played second fiddle to promotion because in most cases, promotion has had first call on available funds.

After negotiating terms that suit the industry, legislation was enacted to introduce a levy and collection system which will require all growers to pay a levy on all avocados sold domestically or exported overseas. The legislation came into effect on the 1 August with levies being imposed from the same date. This levy is completely separate from any that growers may already be paying to State Associations.

### The Avocado Industry Joins HRDC

By joining the HRDC, the industry now has a method of collecting levies exclusively for research from all growers throughout Australia and to have those levies increased by a Government subsidy on a dollar for dollar basis. For example, let's say a research project is approved which costs $50 000. The industry would pay from these new levies $25 000 and the Federal Government would pay $25000, thus enabling the industry to engage in many more research projects than it could in the past.

Although the HRDC is a Government instrumentality, it can hardly be considered a bureaucracy because it consists of only three people and a Board of control. Therefore, the HRDC has to rely heavily on the individual to fulfil its tasks.

The avocado industry itself, through the AAGF, is responsible for determining

what projects deserve research, their priority and together with the HRDC, who will carry out that research. The industry is also responsible for monitoring the projects and ensuring that results are communicated to all growers and any other people who could be affected. The recent Research Workshop attended by scientists and representatives from each State's avocado association, was the first step in this process.

### Definitions

The following definitions are given to assist with your understanding of this article . Any person who owns the avocados immediately after they are harvested is considered to be the 'producer', and anybody who carries on a business that is **not** wholly or substantially involved in selling or processing horticultural products is considered to be a 'minor first purchaser'.

Some examples of a minor first purchaser that you, as a producer may encounter would be restaurants, clubs, supermarkets, shops not being greengrocers and catering services.

### The Scheme

The new avocado levy and export charge will operate along similar lines to other horticultural levies on commodities like apples, pears and citrus.

Although these levies are payable by the producer, for ease of collection they are collected through intermediaries such as first purchases, selling agents, buying agents, and exporting agents.

The rate for both levies and export charges has been set by the industry at 3 cents for a standard 6 Kg tray of avocados or $5.00 per tonne for avocados sold in bulk. As an example, an 18 Kg carton, which is equivalent to three standard trays, would attract a levy of 9 cents and a 12 Kg carton, 6 cents.

Growers should note that the levy applies to both domestic and export sales but if the levy has already been paid in respect to a domestic sale then a credit towards the export charge on those same avocados will be allowed.

### How are the Levies Paid?

The levy is imposed at the time the producer makes a sale to a first purchaser or an agent. For avocados sold by the producer to a first purchaser or agent (market agent, merchant, fruiterer or greengrocer), the Act requires the purchaser to collect the levy on behalf of the producer and forward it each quarter to the Department.

Likewise with sales to minor first purchasers (restaurants, clubs, supermarkets, shops and catering services), it is the responsibility of the purchaser to collect the levy.

Where a producer sells his or her own avocados from a roadside stall, a stall at a flea market or growers' market or any other place of sale direct to the public, then it is the responsibility of the producer to pay the levy.

The onus for payment of export charges rests with the exporter or exporting agent.

All levies are due for payment to the Department at the time of lodgement of returns as detailed below. Where levies or export charges are paid late, a penalty will be imposed at the rate of 2% per month on the sum of the amounts unpaid including, in certain situations, penalties already accrued.

### Lodgement of Returns

Each of the following persons are required to lodge quarterly returns:

- first purchasers (except minor first purchasers), buying or selling agents who buy or sell avocados in a quarter; and
- exporters or exporting agents who export avocados in a quarter.

These returns are due for lodgement on or before the 28th day of the month immediately after the end of the quarter, ie. in January, April, July and October.

The following persons are required to lodge annual returns:

- producers who make retail avocado sales directly to the public;
- minor first purchasers who buy leviable avocados during the year; and
- persons who deal with leviable or chargeable avocados in the year and are exempt from lodging quarterly returns for the year.

Annual returns must be lodged on or before 28 February in the following year.

As far as a producer is concerned:

- if a grower exports avocados - put in a quarterly return unless the total number of standard trays handled annually is less than 6 000 and an exemption has been granted, in which case, lodge an annual return; and
- if a grower sells directly to the public - submit an annual return;

otherwise no returns need to be submitted but records must be kept.

Returns must contain the following particulars:

- full name of the person furnishing the return;
- business or residential address (not being a PO Box or bag);
- postal address where different from above, ie. a PO Box or bag;
- the quarter, or year, to which the return relates;
- the volume of avocados sold or bought or exported in the quarter, or one year;
- the total amount of levy or export charge payable; and
- a declaration that the information contained in the return is correct in every material particular.

Return forms are available from Dept. of Primary Industries and Energy.

A person may apply for an exemption from lodging a quarterly return if he or she believes that less than 6 000 standard trays will be dealt with in a calendar year. The 6 000 standard tray limit, or equivalent, is to be taken as the total of all avocados likely to be dealt with, including exports, in that calendar year. Applications for exemption should be made to the Secretary of the Department.

### Records

In addition to lodging returns, producers of avocados, exporting agents, exporters, first purchasers, selling and buying agents must keep records of dealings with avocados in each quarter.

Where a producer forwards a Consignment Note with avocados going to a first purchaser, the retained copy of that Note is sufficient record. Where the sale is to a minor purchaser or if there is no Consignment Note, the producer should record for each sale the name of the company or person to whom the avocados are sold, the quantity involved and the date of sale. For retail sales, the record should just show the quantity and date.

Records must be retained for a period of 5 years from the last day for lodging a return in respect of those avocados. Failure to comply could result in the Court imposing fines of up to $1 000.

A person may be authorised by the Secretary of the Department to enter and inspect premises, with the consent of the occupier of in accord with a search warrant, to ascertain if the provisions of the legislation are being, or have been, complied with. Particular emphasis is given to the verification of information provided on return forms and the correctness of amounts paid.

### The Department

Many avocado growers will have been contacted be the Government Levies Management Unit and will have already received a circular concerning the handling of levies. If you did not get one, or you wish to obtain further information about the arrangements, you should write to:

The Manager
Levies Management Unit
Department of Primary
Industries and Energy
PO Box E4488
Queen Victoria Terrace ACT 2600
Ph: 06 272 5349
Fax: 06 272 5695
Levies Hot Line Ph: 008 020 619

Although the Department is the authority in this matter and their requirements must be met, it is the avocado industry that sets, controls and uses the levy.

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# Keeping In Touch....

### Avocado Industry Joins A.H.C.

At its recent Annual General Meeting, the Australian Avocado Growers' Federation agreed to take up membership of the Australian Horticultural Corporation. The membership application has to be approved by the Hon. Simon Crean, Minister for Primary Industries and Energy and Parliament.

The new President of the AAGF, Mr Robert Mosse, said that the decision had come after $2^1/_2$ years of debate and he was now looking forward to working with the Corporation.

"The avocado industry will derive many benefits from its membership of the Australian Horticultural Corporation, not the least of which will be a high national profile for our wonderful product", he said.

"Quality assurance, joint marketing ventures, national promotion, market access for exports and value adding are just some of the issues that the industry will now be in a position to develop and promote".

"The AAGF has taken a conscious decision to adopt a genuine national approach to the issues affecting our industry. We firmly believe that this move is in the best interests of avocado growers in efficiently and effectively marketing the most nutritious fruit on earth - the avocado".

Mr Crean has been requested to implement a national levy of 15 cents per tray to fund this initiative.

**THE FEDERATION**

**SECRETARY:**
Mr Ross Boyle, PO Box 19,
Brisbane Markets Q 4106
Ph: (07) 379 0228
Fax: (07) 379 9283

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

**PRESIDENT:**
Mr Robert Mosse Ph: (066) 283 584

**VICE PRESIDENT:**
Mr Ross Richards Ph: (085) 855 341

**EXECUTIVE OFFICER/TREASURER:**
Mr Ross Boyle Ph: (07) 379 0228

**QUEENSLAND:**
Dick Armstrong, David Rankine, Don Lavers, Alex Kidd, R.M. Dalton

**NEW SOUTH WALES:**
Warren Meredith, Robert Mosse, Keith Johnson, George Gordon, Graham Anderson

**VICTORIA (Sunraysia):**
Marion Matthews

**SOUTH AUSTRALIA:**
Ross Richards

**WEST AUSTRALIA:**
D. Duncan