

# Avocado information kit

Reprint – information current in 2001



## REPRINT INFORMATION – PLEASE READ!

For updated information please call 13 25 23 or visit the website [www.dpi.qld.gov.au](http://www.dpi.qld.gov.au)

This publication has been reprinted as a digital book without any changes to the content published in 2001. We advise readers to take particular note of the areas most likely to be out-of-date and so requiring further research:

- Chemical recommendations—check with an agronomist or Infopest [www.infopest.qld.gov.au](http://www.infopest.qld.gov.au)
- Financial information—costs and returns listed in this publication are out of date. Please contact an adviser or industry body to assist with identifying more current figures.
- Varieties—new varieties are likely to be available and some older varieties may no longer be recommended. Check with an agronomist, call the Business Information Centre on 13 25 23, visit our website [www.dpi.qld.gov.au](http://www.dpi.qld.gov.au) or contact the industry body.
- Contacts—many of the contact details may have changed and there could be several new contacts available. The industry organisation may be able to assist you to find the information or services you require.
- Organisation names—most government agencies referred to in this publication have had name changes. Contact the Business Information Centre on 13 25 23 or the industry organisation to find out the current name and contact details for these agencies.
- Additional information—many other sources of information are now available for each crop. Contact an agronomist, Business Information Centre on 13 25 23 or the industry organisation for other suggested reading.

Even with these limitations we believe this information kit provides important and valuable information for intending and existing growers.

**This publication was last revised in 2001. The information is not current and the accuracy of the information cannot be guaranteed by the State of Queensland.**

This information has been made available to assist users to identify issues involved in the production of avocados. This information is not to be used or relied upon by users for any purpose which may expose the user or any other person to loss or damage. Users should conduct their own inquiries and rely on their own independent professional advice.

While every care has been taken in preparing this publication, the State of Queensland accepts no responsibility for decisions or actions taken as a result of any data, information, statement or advice, expressed or implied, contained in this publication.



Queensland Government



# Before you **START**

*If you have never grown avocados before, you will find this section very useful. It is a checklist of the things you need to know before you start and it will help you make the right decision about growing avocados. The information here is brief and to the point. We provide more detail on important areas in other sections of the kit. Symbols on the left of the page will help you make these links.*

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## **An introduction to the avocado industry**

Australia grows about 4000 ha of avocados. The main growing areas are in Queensland, New South Wales and Western Australia.

In Queensland, avocados are grown mainly on the Sunshine Coast, Bundaberg–Childers district, Central Burnett, Atherton Tableland, Tamborine, Toowoomba range and the Lockyer Valley.

In New South Wales, most production comes from the Northern Rivers, Coffs Harbour–Nambucca region and the Stuarts Point, Comboyne and Dareton districts.

In Western Australia, the main growing areas are around Perth and in the Pemberton district.

Smaller Australian production areas include the Sunraysia district in Victoria and the Riverland area of South Australia.

Many different varieties are grown, but most of the industry is made up of Hass, Fuerte, Sharwil, Wurtz and Shepard. Orchards range from 50 to 35 000 trees and trees are grown from grafted nursery stock.

The destructive disease, Phytophthora root rot, is the major limitation to production. Avocados must be grown on well-drained soils and root rot control measures adopted.

With a range of varieties and growing areas in Australia, fruit is available to consumers year-round. The harvest starts in mid-February in North Queensland with Shepard, and concludes at about the end of February, a year later, in Western Australia with Hass and Reed. Most fruit is harvested in Queensland and northern New South Wales from about May to September.

Fruit is mostly consigned to wholesale markets in Brisbane, Sydney, Melbourne, Adelaide and Perth, but a small amount is exported overseas.

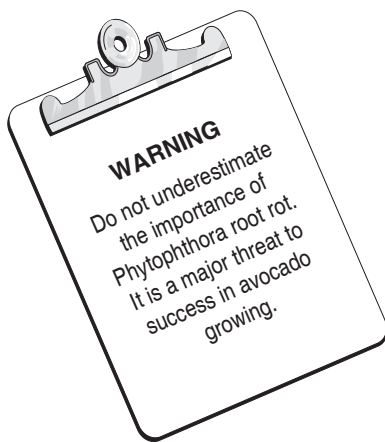
## **Know what you are getting into**

Over the years, avocado has been a popular crop for new growers because it has been perceived as one of the more profitable horticultural crops. In some areas, it has also been seen as a glamour crop, grown in attractive rainforest settings and servicing the luxury end of the fruit market. Avocado growing has also been attractive to 'hobby' farmers because the extended harvest season is seen to be less physically demanding than for some other tree crops.

There are several constraints, however, to successful avocado production. Here are the important things you need to know.

- In recent years, production has increased substantially from new orchards coming on stream. Recent figures from the Australian Bureau of Statistics show that over half of the more than 820 000 trees planted are under six years old, with production expected to increase from 23 000 t in 1998 to over 31 000 t in 2000. Consequently, average prices have fallen substantially.

Good returns rely heavily on the production of quality fruit with good flavour, little or no skin damage and free of pests and diseases. This requires skilful management of orchard operations such as fertilising, watering, pest and disease control, harvesting and postharvest care.



- Returns also depend heavily on fruit being produced and marketed under a quality management system. Prospective growers should see this as essential. Most customers now demand growers use a HACCP-based (Hazard Analysis and Critical Control Point) system such as Freshcare to ensure fruit meets recognised food safety requirements.
- Avocados are highly susceptible to the serious disease Phytophthora root rot. Successful long-term production requires land with very well-drained soils and this is scarce and expensive. Even when grown in suitable soils, trees need a continuous and regular program of cultural and chemical control measures. Compared to other crops, a higher level of management and care is needed for successful avocado production.
- Avocado trees are generally large and can be difficult to spray and harvest. Air blast machinery can make spraying easier. Fruit is harvested manually and this can be labour intensive and expensive.
- In most areas of eastern Australia, avocado fruit are potentially at risk from serious damage from fruitspotting bug and anthracnose disease. If these are not managed properly, fruit yield and quality will be reduced significantly. To produce quality fruit, trees must be sprayed every two to three weeks from fruit set through to harvest.

Before embarking on growing avocados, take time to research the subject thoroughly. Examine potential markets and their variety and quality standards, and thoroughly check market price and throughput information.

Be cautious about extravagant claims of economic performance and do a thorough business plan. In particular, take note of the variation in prices and assess how increases in production would affect returns. The business plan should address how the operation will deal with lower cash flows caused by production and/or prices being less than expected.

## What you can expect to make

### Yields

Although trees may start to bear fruit in the second year, commercial quantities are generally not harvested until the third year. Yields will depend on variety, district, season and the level of management, and are extremely variable across farms and districts.

It is important to realise that the average yield across all Australian orchards is a low 7 t/ha. This reflects the variable genetic performance of seedling rootstocks and difficulties in properly managing the devastating Phytophthora root rot disease. On the other hand, very good growers using elite and uniform rootstocks and a high level of root rot management may achieve average yields of 20 t/ha. For a new grower, achievable yields are somewhere between these extremes. Table 1 provides an indication of achievable yields for one of the common tree spacings.

**Table 1.** Achievable yields per tree (kg) and per hectare (t) for a new orchard under good management (based on a spacing of 8 m x 4 m or 312 trees/ha)

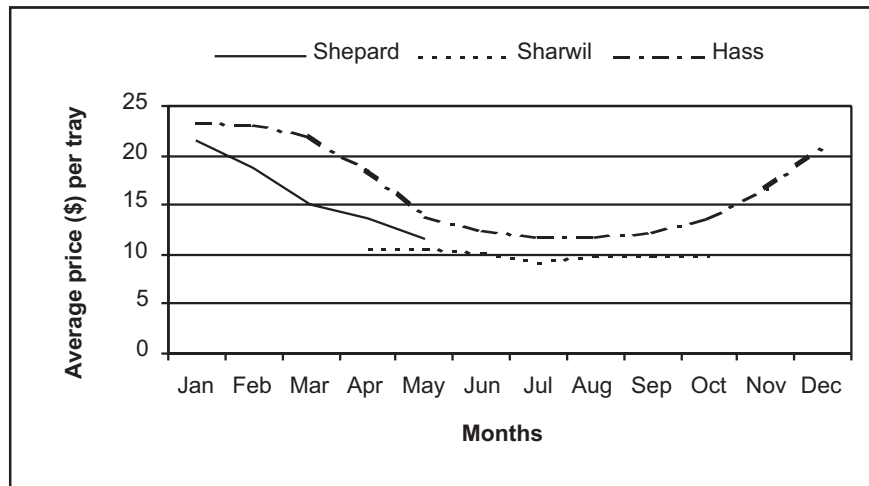
Year	3	4	5	6	7*	8*	9*	10*
Yield per tree (kg)	12	26	38	45	51	45	51	45
Yield per hectare (t)	4	8	12	14	16	14	16	14

\* Note that once trees form a hedgerow, a biennial bearing pattern with an 'on-year' and 'off-year' is generally established.

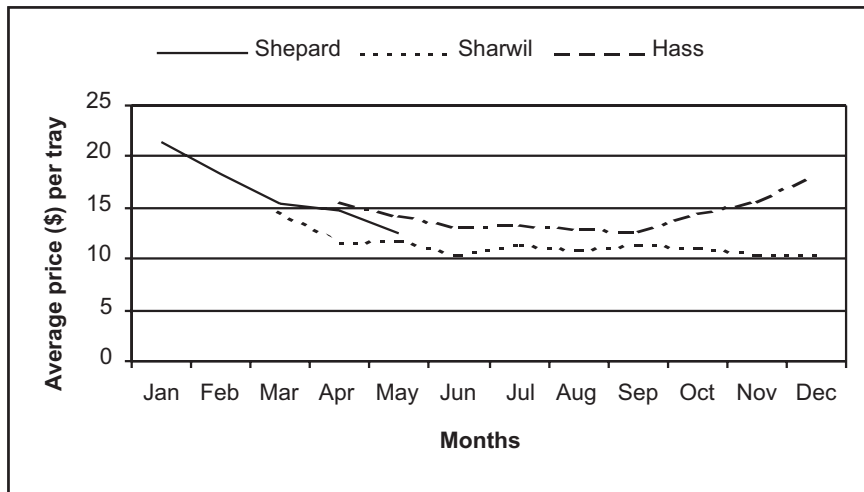
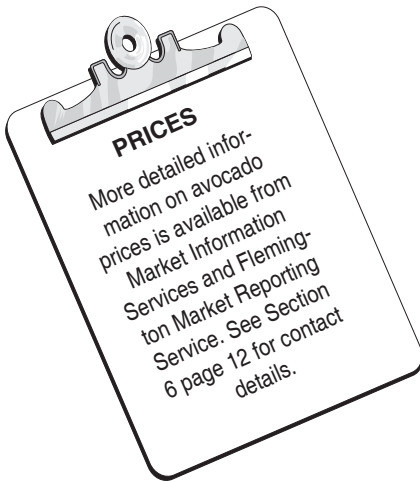
### Prices

Current market prices range from about \$10 to \$22 per single layer tray for Shepard and from \$12 to \$24 per single layer tray for Hass. The higher prices are for high-quality, first-grade fruit produced in the early or late season when there is little fruit on the market.

An indicator of price and volume throughput for the Brisbane and Sydney Markets is shown in Figures 1 to 3. (Information courtesy of Market Information Services, Brisbane and Flemington Market Reporting Service, Sydney.) Note that large volumes of fruit are now marketed directly to supermarket chains through packing houses and marketing cooperatives. Prices for thi fruit may vary from central market prices.



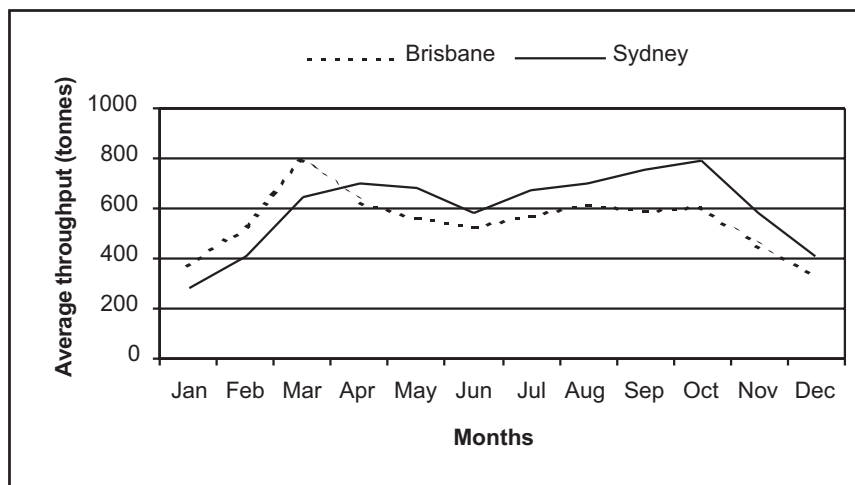
**Figure 1.** Average monthly price for single layer trays of Shepard, Sharwil and Hass vocados at the Brisbane Market 1997 to 2000



**Figure 2.** Average monthly price for single layer trays of Shepard, Sharwil and Has avocados at the Sydney Market 1997 to 2000



Market information  
Section 6 page 12



**Figure 3.** Average monthly throughput for avocados at the Brisbane and Sydney Markets 1997 to 2000

### Production costs (variable costs)

Production costs range from about \$1000 to \$3000/ha/year during the first three years to over \$18 000/ha/year in the tenth year. This includes all expenses such as fertilisers, chemicals, fuel, harvesting, packing, freight and marketing costs. At orchard maturity, more than 60% of the variable costs are for harvesting and marketing. The figures assume that tree yields are about eight trays (48 kg) per tree and casual labour is hired to assist with picking and packing. Fixed costs such as rates, depreciation and loan interest are not included.

### Gross margin and cash flow

No significant income is received until the third year and annual operating costs exceed annual income until at least the fourth year.

Income after variable costs ranges from about \$800/ha in the fourth year to about \$5000 to \$8000/ha in the tenth year. This assumes a yield of about 12 t/ha and an average price through the season of about \$12.50 per tray.

When capital costs and fixed and overhead costs such as permanent labour, insurance and depreciation are also considered, annual expenses exceed annual income until at least the sixth year. Accumulated income does not exceed accumulated expenses until at least the fifteenth year.

These income figures suggest that the minimum viable orchard size for a family unit is about 10 ha, but this will vary from region to region depending on production and prices.

### The capital you need

Excluding the cost of house and land, you would need about \$200 000 to \$250 000 to establish a 10 ha orchard. This includes the cost of a farm shed, second-hand tractor, second-hand farm vehicle, irrigation system, weedicide sprayer, slasher, miscellaneous equipment and tree establishment. Once trees begin bearing, a further \$40 000 to \$50 000 is needed for an air blast sprayer and cherry picker, though the cherry picker is generally only necessary in about the sixth year.



Financial management  
Section 4 page 12



Capital costs  
Section 4  
pages 15 and 22

Some growers belong to cooperative packing sheds. If you choose to pack on-farm, you would need from \$60 000 to \$100 000 more for packing line equipment, a cool room and a shed to house them.

## The farm you need

a key issue



Importance of soil drainage  
Section 4 page 5



### Soil

In areas with over 700 mm of rain per year, you need well-drained soils with no clay layers or rock shelves within 1.5 m of the surface. In lower rainfall areas, 1 m of well-drained soil is generally sufficient. In high rainfall areas (over about 1500 mm per year), at least 2 m of well-drained soil is recommended.

Where the topsoil is slightly less than the required depth, plant the trees on mounds.

### Slope

Slopes of up to 15% are suitable provided the orchard is designed to minimise erosion. Steeper slopes present a major erosion risk and make it difficult to operate machinery safely. Avoid these wherever possible.

### Aspect

Avoid windy sites to minimise abrasion of fruit and limb breakage. Slopes that face away from the direction of the main prevailing winds are preferred. For example, in eastern Australia, the most protected slopes are those facing from north-east to north-west. Planted windbreaks are required in most situations.

### Climate

Frost-free areas are preferred, but mature trees will tolerate temperatures as low as  $-4^{\circ}\text{C}$  for short periods without damage. Trees can also tolerate temperatures as high as  $40^{\circ}\text{C}$  for short periods. However, prolonged exposure to high temperatures results in severe stress and loss of productivity. Night temperatures of 5 to  $10^{\circ}\text{C}$  between May and July stop shoot growth and promote good flowering. Temperatures above  $10^{\circ}\text{C}$  at night and between 20 and  $30^{\circ}\text{C}$  during the day are required at flowering (generally around September) to give good fruit set.

### Water supply

Irrigation is essential in most areas, particularly from August to April.

For coastal areas of Queensland and New South Wales, a water storage reserve of 5 megalitres (ML) per hectare is generally necessary to maintain production in a dry year. This may be reduced to about 4 ML/ha in wetter areas, but needs to be increased to about 8 to 12 ML/ha in drier coastal areas and inland areas such as the Central Burnett of Queensland, the Dareton district of New South Wales and the Riverland of South Australia.

In Western Australia, a water storage reserve of between 10 ML/ha (Pemberton) and 18 ML/ha (Perth) is recommended.

a key issue



Understanding the avocado tree  
Section 4 page 39

As avocados are sensitive to saline irrigation water, water salinity should not exceed 0.6 deciSiemens per metre (dS/m) with a chloride content less than 80 milligrams per litre (mg/L).

## **The equipment you need**

The equipment needed in an avocado orchard is shown in Table 2.

**Table 2. Essential and optional equipment**

### **Essential**

Permanent watering system including pumps, pipes and emitters (under-tree minisprinklers are preferred)

50 kW tractor (a smaller unit can be used until the third year). A 4WD tractor is recommended for steeper orchards such as those in the Coffs Harbour region

Weedicide sprayer (knapsack, handgun or spray boom)

Power sprayer for pests and diseases (air blast or similar air-assisted sprayer preferred). A smaller, powered handgun sprayer can be used for small orchards or for the first few years in larger orchards, but good spray coverage is difficult to achieve

Splatter sprayer for applying fruit fly bait (eastern Australia only)

Injection equipment for root rot disease control

Protective equipment for use when spraying

Slasher or mower

Harvesting equipment including picking poles or ladders and picking buckets or bins

Chainsaw for pruning and/or removing trees

Trailer, carryall or utility for farm transport of fruit. A 4WD vehicle is necessary for steeper orchards such as those in the Coffs Harbour region

Chemical storage area

Shed or undercover area with grading and brushing equipment, as well as postharvest dip or spray facilities to meet interstate produce movement provisions (if packing your own fruit)

Cool room preferably with forced-air cooling facility (if packing your own fruit)

### **Optional**

Fertiliser spreader

Fertigation system

Cherry picker for harvesting

Mechanical saw for canopy management

Forklift

Small orchards may reduce capital costs by joining a packing cooperative and buying second-hand equipment.

## **The labour you need**

Two people can comfortably manage up to 7 ha of mature trees without permanent labour. However, casual labour will be required to assist with harvesting and packing, and possibly when injecting for root rot control. Access to a central packing shed eliminates the need for on-farm labour for postharvest treatment, grading and packing.





## **Other considerations**

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It takes time to learn how to grow avocados well. A good knowledge of the principles of tree management and an ability to recognise problems in the orchard are essential. You may need to employ specialised pest management, nutrition and irrigation consultants or learn these monitoring systems yourself. This also involves a willingness to buy and use the AVOMAN software package and record the cycles of tree growth, flowering and fruit production.

In most areas of eastern Australia, avocados need spraying every two to three weeks for up to six months of the year for fruitspotting bug and up to nine months of the year for anthracnose control. In addition, trees require either several sprays or at least annual injection for root rot control. Weekly checking is needed for other pests to determine when control measures are necessary.

In Western Australia, routine spraying for fruitspotting bug is not required, but sprays to control anthracnose are necessary, as is weekly monitoring for pests.

In all states, you need special accreditation to buy and apply some chemicals.

During harvesting peaks, large quantities of fruit must be handled in a short period. This requires good organisational and labour management skills.

To maintain yields and fruit quality, the orchard canopy must be carefully managed through pruning and possible tree removal. This requires good knowledge of the principles of tree management.

Knowledge of marketing and a commitment to quality throughout the entire production and marketing chain are essential if returns are to be maximised. Regular communication with people in the market chain, as well as other growers, is an integral part of this process.

To be successful, the orchard must be run as a business. This is a complex operation requiring many skills such as the ability to:

- develop a business plan and review it regularly;
- monitor receipts and expenses and maintain good financial records;
- maintain a quality assurance program with accurate farm records;
- manage labour efficiently;
- become involved in market development by the industry.

Successful growers keep up to date with changes in production and marketing technology, and are prepared to quickly adopt or adapt better systems for their farms. It will help if you are prepared to do your own research and experiment with new ideas.