

## Establishing an Orchard

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### SITE SELECTION

Tree crops do best on deep well drained soils (1 metre plus). Tall native timber such as stringy bark (*Eucalyptus tetradonta*) and Darwin Woollybutt (*E.miniata*) indicate the most suitable soils. Avoid areas where the trees are stunted and where large concentrations of *Grevillea pteridifolia*, melaleucas and pandanus are found.

Mangoes are the exception. For mangoes deep well drained soils can be a disadvantage as they often result in large vigorous trees with poor quality fruit. Mangoes do best on poorer soil types but avoid areas prone to water logging. Shallow soils over broken rock, to allow root penetration for anchorage are suitable, as they restrict growth and facilitate plant stressing to improve flowering.



Level or slightly sloping ground is ideal, avoid depressions and water courses.

The most important criteria in site selection is the availability of a reliable water supply adequate to irrigate the orchard.

## **SITE PREPARATION**

Check for and treat termites (*Mastotermes darwiniensis*) at least a month before clearing. See Agnote No. A14 "The Horticultural Hobby Farm".

Clearing is best done when soil is moist, usually at the beginning or end of the wet. Roots come out more easily and trees are less likely to snap off leaving stumps in the ground.

Deep ripping and stick raking removes roots and reduces sucker regrowth

Filling in holes and levelling with a grader is beneficial for later operations such as spraying, slashing and cherry picker harvesting.

Buffalo, wallaby and pig proof fencing of the site, especially in the more remote areas, is a good insurance against damage by these pests.

Where necessary establish windbreaks as soon as possible to get crop protection. A quick temporary windbreak can be achieved with Bana grass. Most orchards benefit from wind protection, windbreaks also reduce the incidence of spray drift.

## **ORCHARD DESIGN**

When designing the lay out of the orchard it is important to plan for the future. Certain crops will require bird protection, mainly those which must be allowed to ripen on the tree such as rambutans, carambolas, abiu, sapodillas and guavas. The most effective method is by complete over head netting of the orchard, in which case space must be allowed for a structure to support the netting.

Rows must be situated at a sufficient distance from the boundary to allow for the operation of machinery such as slashing, spraying and harvesting equipment on the outside rows when trees are mature. This distance will vary with the crop. For instance a mature mango tree will cover an area with a diameter of over 8 metres and it is pointless planting it 2 metres from the fence line. Similarly headlands at the ends of rows should allow enough space to turn machinery.

Always keep varieties together. It is important that they are on the same irrigation line, as different varieties require different management regimes.

High density planting will give higher yields in the early years, but once trees get larger competition between plants for nutrients, moisture and light can result in smaller fruit and poor fruit colour. One method of overcoming this is to plant trees close together in the rows initially to get the higher yields, once the trees have grown together cut out every second tree. For mangoes, for example, the initial spacing could be 10 m x 6 m. By year 7 or 8 when trees have grown together cut out every second tree and change row direction giving a spacing of 12 m x 10 m which should allow good access for machinery operation and plenty of light for fruit colouring.

In mangoes higher density plantings have been shown to have potential. Trees are planted 3 - 4 m between rows. The aim is to stunt the growth of the trees due to competition and this results in a hedging effect, making harvesting and pest and disease control more efficient.

## PLANT SPACINGS

Crop	Distance between rows	Distance in rows
Abiu	8 m – 10 m	3 m - 8 m
Carambola	6 m - 8 m	2 m - 5 m
Citrus	6 m - 8 m	3 m - 7 m
Guava	6 m - 8 m	3 m - 6 m
Mango	10 m –15 m	5 m –12 m
Rambutan	8 m – 10 m	5 m - 8 m
Sapodilla	8 m – 10 m	6 m - 8 m

## TREE NUMBERS

Approximate number of trees per hectare

Distance between trees	Rectangular systems	Equilateral triangle system
6 x 6	278	320
8 x 6	204	
8 x 8	156	180
9 x 9	123	142
10 x 6	170	
10 x 8	130	
10 x 10	100	114
11 x 11	83	95
12 x 10	90	
12 x 12	69	80
15 x 10	60	

## IRRIGATION

Ensure the supply of water is sufficient for the number of trees to be planted. As a rough guide a mature orchard will require approximately 35,000 to 60,000 litres of water per hectare per day on average. To meet these requirements a bore with a flow rate of 2 - 4 litres per second would be needed.

Under tree sprinklers are the most efficient and cheapest form of irrigation. There are a number of types on the market. One commonly available design has a flipper in the centre which spins and throws the water out to a distance of up to 9 m diameter. This flipper can be removed and replaced with a deflector, reducing the diameter of irrigation to 1.5 - 2 m. This is suitable for young trees and can in fact be used for up to four years before it becomes necessary to spread the wetting pattern out further.

Under tree sprinklers come in a range of flow rates. It is thus possible to design the irrigation system to suit the amount of water available. It is important that the correct size pipe is used to ensure there is sufficient water to operate the sprinklers effectively. Most irrigation suppliers will design a system for your particular situation.

For example to operate 10 sprinklers rated at 100 L/hr at 150 kpa in a row of fruit trees at 8 metre spacings would require a minimum size polythene pipe of 20 mm and an operating pressure of 250 kpa.

The irrigation pipe should be buried just under the surface to keep it out of the way in case of damage from fire and traffic.

The end of each lateral should be exposed to allow flushing out of the system periodically.

Ensure the irrigation system is in and working before planting any trees.

## **VARIETAL SELECTION**

- Plant varieties that the market requires.
- Plant varieties that are suited to the locality.
- Some species require particular species for good pollination, other species require specific rootstocks.
- Get advice if unsure.
- Plant only grafted trees from reliable sources.
- Plant only vigorous, healthy sun hardened plants.
- If planting large numbers it is advisable to order them well in advance to ensure they are available when needed.

## **PLANTING PROCEDURE**

Most species are best planted out in the early wet season. Mangoes can be planted at any time of the year, provided the irrigation system is in and operating.

The planting hole should be about twice the size of the plant container.

A post-hole digger speeds up planting considerably.

As a precaution against termites for the first few months the hole should be treated with chlorpyrifos. The chlorpyrifos is mixed at 3 mL/L using a 500 g/L concentration product. This is applied to the sides and bottom of the hole with a watering can ensuring all surfaces are wet. Care should be taken when planting not to collapse the sides of the hole.

Mix single super plus trace elements and dolomite in equal amounts and apply approximately two cups to each hole before planting, one to the sides and bottom of the hole and the other over the soil dug out of the hole.

Try to select an overcast day for planting or plant in the late afternoon if possible.

Trees are ready for planting out when the roots have filled the container and hold the soil together in a ball after removal, but should not be pot bound.

Water plants in containers about an hour before planting out.

Back fill the hole till the soil level in the container is level with the surrounding ground.

Firmly press the soil in around the plant to ensure good contact and support, and reduce slumping or sinking of the plant in the hole.

When planting into dry soil make a slight basin around the base of the plant and water immediately.

Mulch around the base of the plant after planting out to keep the soil cool and reduce evaporation. Mulch should be kept at least 5 -10 cm from the base of the plant.

## **MANAGEMENT**

Never allow grazing stock in with young plants.

Control grass and weeds around young plants, as they compete for nutrients and moisture and they harbour insect pests.

Frequent light fertiliser applications are recommended for the first year. (See Agnote No. D10 "Fruit Tree Fertiliser Rates in the Top End").

Avoid excessive, deep cultivation around the trees.

Keep grass short in the orchard and maintain fire breaks.

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