

Orchard Shelter

Wind can cause damage to both avocado trees and fruit. Orchard shelters protect the trees and fruit from physical damage and help to improve the microclimate within a sheltered area by helping to maintain a higher temperature and humidity. Temperature can be improved by up to 3°C in a sheltered zone.

Shelter can be in the form of shelter trees, or artificial shelterbelts. Shelter trees are inexpensive and effective; however they should ideally be planted years in advance of an orchard. Artificial shelterbelts are expensive and remain at the height installed, however they are effective immediately.

For exposed orchards:

- Ideal block size is a rectangle 70-80m wide (E-W) x 100-120m long (N-S).
- Shelter should be approximately 10-12m high.

HEIGHT

The height of the shelterbelt determines the distance sheltered by the shelterbelt. If the height of the shelter is H, the distance of the sheltered zone will be 8 x H. For example, a 10m high shelter will provide a sheltered zone 80m downwind of the shelter. Allow boundary shelter on the south and west sides to grow as high as possible.

DENSITY

The density of the shelter has the greatest influence on wind speed, orchard humidity and temperature. The denser the shelter, the higher the increase in temperature in the sheltered zone. Orchards exposed to cold dry winds during flowering should favor dense shelter tree varieties such as Cryptomeria. Less dense shelter reduces turbulence and the physical impacts of storm winds, but does not insulate an orchard from cold, dry spring winds. Density can be improved by planting a double row. This is especially recommended for pines planted as boundary shelter. When establishing dense shelter rows across air drainage lines, care should be taken to prune main stems to 0.5-1m from the ground to allow cold air to drain out of an orchard.



Figure 6: Cryptomeria shelterbelt in an orchard

BLOCK DESIGN

Exposed orchards should have small block sizes of 1ha or less. The ideal block size is a rectangle 50-80m wide (E-W) x 100-120m long (N-S). Allow for a headland of 10m between shelter row and first row of tree.

TRIMMING

Depending on the species, shelterbelts should be trimmed every 1-2 years. Trim carefully so as not to remove 'green' canopy. Some species (including pines) will not regenerate a side canopy if trimmed too aggressively.

As shelters grow, their roots can extend into the avocado block and compete for water and nutrients. One side of a shelterbelt can be root pruned approximately every 5 years.

SPECIES

CRYPTOMERIA JAPONICA (JAPANESE CEDAR)

This is one of the preferred shelter species, as it is dense, long-living and easily maintained. The young trees are extremely sensitive to wind and to glyphosate. Cryptomeria is a host plant for greenhouse thrips, a pest of avocados.

Guidelines for establishing a Cryptomeria shelter:

- If on an exposed site, erect a 1.8m high shade cloth stop on the W-side of the tree row (stapled to a basic fence-line).
- Ensure that you source large, field-grown trees from a reputable nursery.
- Plant trees 2 m apart in the row, in early July.
- Plant the trees without any amendments (fertiliser, compost, sheep pellets, etc.).

Care of newly planted Cryptomeria trees:

- Keep the tree row free of weeds by hand weeding initially (only use glyphosate once the tree is in its third year or more, and the bark is tough and woody).
- Keep the trees well-watered.
- From their third year, begin manual pruning of the trees and carefully apply small quantities of composite fertiliser.

PINUS RADIATA (RADIATA PINE)

One of the preferred shelter species, pine trees provide a dense, easily established, fast-growing and hardy shelter. They have to be regularly trimmed and topped in order to maintain an effective barrier. It is possible to allow pines to grow un-topped on the south and west boundaries. Trees should always be side-trimmed, even if allowed to grow tall, as this will promote a dense side-canopy. Pines respond very well to irrigation and fertilising, especially on sandy ground.

CASUARINA CUNNINGHAMIANA (AUSTRALIAN SHE-OAK)

A hardy, moderately fast-growing species, which provides a 'filtering' barrier. This species grows in a wide range of soil conditions. Care should be taken not to trim this shelter too heavily and to promote as dense a canopy as possible.

ARTIFICIAL SHELTER

Artificial shelter is used in certain situations where shelter is needed immediately and where orchards are productive enough to justify the extra cost.

Advantages:

- Can be erected immediately
- Do not take up a lot of space
- Maintenance free

Disadvantages:

- Expensive
- Do not last as long as natural shelter
- Height is limited and so provides a limited effect, especially on mature orchards
- Density is limited so microclimate effect is limited (i.e. the insulating effect is less than for some natural shelter species).



Figure 7: Artificial shelter used to establish young trees.