

Orchard Shelter Belts

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New Zealand is a comparatively small area of land surrounded by vast areas of water, the Pacific Ocean on the East and the Tasman Sea to the West. Due to this geographical situation New Zealand has a mild, insular climate with plenty of wind.



In the Bay of Plenty which is a coastal area in the northern half of the North Island of New Zealand there is a significant prevailing wind from the South West, where perhaps most of the winds damaging the orchards come from. However, when a north easterly wind blows it is usually very strong, can often last for several days, and coming across a large area of ocean is usually carrying rain. On exposed coastal areas north easterly winds are an extra problem due to salt spray that they can carry.

It has been realized for many years that citrus orchards in New Zealand need good shelter belts to protect the plants from wind, and also to preserve every possible degree of summer heat so important for citrus quality in this climate which is marginal for citrus growing on that score. In addition many of the other sub-tropical fruits grown here such as kiwifruit, tamarillos and passionfruit are very prone to damage when exposed to winds and require good shelter belts to produce good crops.

With this background it can be seen that shelter belts are a fact of life in orcharding in New Zealand, and that when avocado plantings were being made the more intelligent growers included the planting of suitable shelter belts in their orchard establishment programmes. However some adjustment in thinking has been necessary with avocados due to the greater potential height of the trees compared to the more traditional crops such as kiwifruit grown on a fence 1.8 metres high, or citrus with a maximum height of up to 6 metres.

The normal formula used for sheltering orchards is that effective shelter will be obtained for 8 times the height of the shelter above the crop on level land, or 10 times where the land is sloping gently away from the direction of the wind.

Examples:

1. Height shelter 20 metres—Height avocados 10 metres = 10 metres on flat land 10 metres x 8 = 80 metres effectively sheltered.
2. Height shelter 10 m—Height Kiwifruit 2 metres = 8 metres on land gently sloping away from wind 8 metres x 10 = 80 metres effectively sheltered.

This formula has been a useful guide, but in practice block sizes have tended to be somewhat smaller than calculated by this method, due to the major importance of wind as a factor in fruit growing here.



Figure 2. Tall shelter of gum trees alongside a young avocado planting.

With the greater potential height of avocados it has been necessary to put more emphasis on to taller shelter species such as gums and pines, with an eventual height of something in excess of 30 metres. These are necessary as boundary shelter on the south western quarter to break up and lift the higher air currents. Other shelter species with less potential height are then used for subdivisional shelter within the tall boundary shelter.



Figure 3. Gum trees as shelter for avocados.

Some of the gums such as *Eucalyptus saligna* and *Eucalyptus regnans* have a very fast growth rate under New Zealand conditions, up to 10 metres in 2 years if well tended, and will provide shelter quickly for young blocks. *Pinus radiata* will also grow quickly, up to 5 metres in 2 years, and can often be grown in association with gums for tall boundary shelter.

In the past the Lombardy Poplar was widely used for orchard shelter belts in New Zealand, and particularly in the Bay of Plenty. However, with the arrival of Poplar Rust, *Melampsora larici*, an extremely debilitating disease, emphasis has moved more to the other shelter types. In fact, the effect of this specific disease has shown the importance of having a shelter belt system made up of several different tree types. The arrival of a new specific pest or disease will not then decimate a shelter system totally.

The Matsudana Willow, *Salix matsudana* is now being widely used as a substitute for poplars, being deciduous, cheap and easy to propagate from cuttings, but has a somewhat wider growth habit than the very fastigate Lombardy Poplar.



Figure 4. Three-year-old Matsudana Willows effectively sheltering a young block of Kiwifruit.

For evergreen shelter types the Japanese Cedar, *Cryptomeria japonica*, Australia She-Oak, *Casuarina glauca*, Leylands Cypress, *Cupressocyparis leylandii* and some of the New Zealand *Pittosporum* species are being widely used, as also is the Giant Bamboo, *Bambusa oldhami* in some situations.



Figure 5. Mature row of Japanese Cedar sheltering maize and a strawberry runner bed.



Figures 6 & 7. Individual artificial shelters around young avocados.



It must be understood however, that there is no perfect shelter tree and any species must be chosen by weighing up its merits against its demerits for the particular situation involved. For example, Giant Bamboo, which forms a very dense shelter of up to 10 metres, may be ideal in one situation but increase the frost risk, by impeding air

drainage to the point of being unacceptable in another.

When new growers pay high prices for land they want to get it planted and into production as quickly as possible. However, experience has shown that there is likely to be a loss rather than gain, by planting without adequate shelter. Establishment of shelter belts is given first priority, and then the planting of the crop is undertaken when these are well underway.

To enable plantings of avocados to be made before the shelter system is fully effective individual artificial shelter surrounds are often provided for each plant. These are constructed from stout stakes and shade cloth, or hessian. With the rapid growth rate of avocados it is necessary for these to be wide enough and tall enough to accommodate the plant through at least its first growing season and preferably into its second. These constructions in addition to sheltering the plant from the wind, provide some shade for the tender young plants, and where necessary can be closed in to afford frost protection through the first winter.

Where good shelter is provided avocados will grow, and produce well in the better sites of the Bay of Plenty. Shelter not only greatly assists establishment, but also fruit set by holding warmth in the blocks at blossom time which encourages bee activity and is helpful to the pollination processes. But without shelter we cannot expect success in avocado growing in New Zealand.