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## Integrated Brushwood plantings for NRM benefits to farming systems

### What is brushwood?

Brushwood, also called broombush, is a name given to a group of similar Melaleucas. Until recently these plants were all considered to be one highly variable species, *Melaleuca uncinata*. By breaking it up into separate species, each with clearly defined traits, we can now better match the plants to different sites and applications. For example, some of the species have better salt and waterlogging tolerance, or a form more amenable to brushwood fencing. By being able to name that species we know we are getting those characteristics we want, rather than having to use a lengthy description of the features. A list of the species in the complex is given on page 4.

### What are the benefits of integrated brushwood plantings?

Brushwood plantings can be multi-purpose additions to the farm landscape. They can offer protection from wind and water erosion, contribute to the mitigation of salinity and waterlogging, provide wildlife habitat, as well as being a potential source of farm income.

### Establishment and growth

Observations in Western Australia have shown that growth of 50cm to 60cm in the first year can be expected. These growth rates can be considered conservative, as they have been achieved at high density (4000 stems per hectare), in gravelly sands with a rainfall of 290mm.

Brushwood species grow naturally in a wide range of landscape positions, from hilltops to deep mid-slope sands and the saline margins of drainage lines. The plants are hardy and versatile, and while they will grow on low nutrient soils, shallow rock, sandy clay and deep sands, like any other tree crop their growth and productivity will be enhanced with better soils and nutrient levels. Within their natural range, multiple species within the complex frequently co-occur.



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W E S T E R N A U S T R A L I A

## Wind erosion control



*A single row of trees provides little protection from strong winds*

Wind erosion strips away nutrients, organic matter, clay and silt and so represents an expensive export from the farm. Exposure in crops and pasture induces water stress, and reduces photosynthesis and growth. In animals it causes energy use to be redirected and can lead to lamb or post shearing losses. The situation is resolved by the provision of suitable shelter, in the form of windbreaks, shelterbelts and stock havens.

The best year round treatment for the wind hazard will come from integrated plantings of perennial shrubs and trees as windbreaks across the landscape. Design criteria relating to height, orientation, spacing, porosity etc. are well documented, and this technical information, along with species selection needs to be applied on a site by site basis. Brushwood species can play a key role here, as they are widespread across both the Wheatbelt and local landscapes, and commonly occur on the light to medium soils that are especially prone to erosion. Their shrubby form, multiple stems and dense foliage makes them ideal windbreaks.

A network of windbreak plantings can be demonstrated as cost effective in its own right, with the land taken out of production being compensated by the increased productivity of the remainder of the farmland. Brushwood is also a potentially commercial crop, however if you plan to harvest windbreak plantings, give some consideration to management strategies at harvest time, such as maintaining stubble or pasture growth, or harvesting alternate hedges of plants to maintain some cover.

Farm management and site productivity considerations will determine if block or belt and alley plantings are appropriate. For belt plantings, multiple rows can be planted 2m apart, with brushwood plants as close as half a metre apart. The alley spacing should then be adapted to suit the land manager's machinery.

Brushwood plantings can consist of strategically placed blocks or alleys to protect fragile soils and integrated with standard agricultural practices. A well designed system can easily be incorporated by land managers using guidance systems.

It has also now been found that brushwood stands can be control grazed and can provide excellent shelter for stock.



## Water use and salinity control

Waterlogging reduces plant growth and diminishes agricultural productivity. The rainfall, the drainage of both the landscape and the soil, and the water storage capacity of the soil determine the extent of waterlogging. Revegetation is a good option for addressing this problem as it deals with the excess water in situ, rather than exporting it off site where it may contribute to flooding or downstream waterlogging. Research has shown that it is possible to lower watertables in the lower rainfall areas with alley plantings. Farm plantings located near saline seeps in the Avon have been observed to lower water tables and reduce spread of salinity. In dealing with water erosion and salinity in the landscape, land managers should consider Melaleucas for harsh sites, to increase total water use. In the WA Wheatbelt, some of the brushwood species grow naturally on waterlogged and saline areas.

For upper and mid slope areas, the combination of trees and surface water drainage provides an optimal treatment, as trees along regularly spaced banks achieve maximum growth using water accumulated by the banks. These plantings can be expanded to a wider belt of trees at critical areas such as the break of slope and where contour lines cross drainage lines. The surface water drains put crop work and vehicle movement on the contour which reduces fuel usage and consequently cropping costs. This contour planning divides up paddocks into management units and the addition of trees to this arrangement causes no further disruption to the working of the paddock. This system also complements other farming aims such as minimising wind and water erosion.

Revegetation can also be targeted to susceptible areas, such as waterways and creeklines where there will generally be minimal disruption to farming practice and often significant ancillary benefits such as wildlife habitat protection and enhancement, and nutrient stripping.



### Are there biodiversity benefits from planting Brushwood?

The shrubby growth habit, dense foliage, and peeling bark of Melaleuca stands can provide habitat for many animals and insects. Melaleucas have a strong scent and attract many insects. Many small birds have been observed to nest in these shrubs. The elusive underground orchid, *Rhizanthella gardneri* has only ever been found in association with the Melaleuca complex.

### Commercial prospects for Brushwood

Several potentially commercial products can be realised from brushwood. The most promising of these is its use in the manufacture of fencing panels for landscaping. Some of the species in the complex have significant quantities of essential oils in their leaves (Brophy et al). Like all woody plantings on farms, potential exists for the trading of the carbon sequestered by these plants. The flowers are considered to be a good source of nectar, and both plantations and native stands are popular locations for bee keepers to locate their hives. Most of the species in the complex have the capacity to resprout after the aerial stems are harvested. Thought to be an evolutionary response to fire, this mechanism means that once established, the plants can be harvested multiple times without the need to replant.



**The species of the “brushwood complex”** - Recent field work and taxonomic study of what was known as *Melaleuca uncinata* (Craven, L. et al., 2001) has revealed that there are at least eleven separate species in the “brushwood complex”.

- *Melaleuca uncinata* occurs east of a line from near Lake King to Coolgardie in Western Australia, across to Victoria. This species is the mainstay of the brushwood fencing industry, and also has high oil foliage. It grows on lower slope, flat, sandy loams.
- *Melaleuca atroviridis* has two forms. Although taxonomically they are inseparable, ecologically they have traits which are very different, and because the species is potentially of commercial significance the distinction is important to state. The “sprouter form” grows high in the landscape in the northern central Wheatbelt. It grows on deep, pale yellow acidic sands. It has a strong coppice ability, good Brushwood fencing potential and good leaf oil. The “seeder form” grows low in the landscape from the north-central Wheatbelt through to the eastern Wheatbelt and Great Southern. Grows on slightly acidic loams, clayey sand to sandy clay. Good salt and waterlogging tolerance, strong growth, but cannot be relied on to resprout after harvest. This is the tallest growing of all the species and forms.
- *Melaleuca hamata* is a sprouting species which is wide spread across the wheatbelt including sites which are seasonally waterlogged. Generally grows on mildly acidic, shallow granite soils. Its wide geographic range and variable form means that provenance selection will be important if the intent of a planting is for a commercial outcome.
- *Melaleuca osullivanii* grows naturally along the Swan coastal plain from Perth to Busselton. It grows on grey sands over clay in seasonally waterlogged areas. An important habitat plant but poor form for Brushwood fencing.
- *Melaleuca concreta* is a highly variable species occurring from North of Perth to Kalbarri, and as far inland as Wongan Hills area. It grows in a range of habitats from waterlogged depressions to deep sand ridges. In the northern part of its range it occurs on shallow sandstone. It has a variable but generally poor form.
- *Melaleuca scalena* grows naturally with *Melaleuca lateriflora* and *Casurina obesa*. It is found from Wyalkatchem to Mount Walker, west to Albany Hwy in the Upper Great Southern. It occurs on grey clayey sand, and shallow duplex soils. It is seldom a vigorous or well formed species.
- *Melaleuca stereophloia* is a tall growing vigorous species found in the northern Wheatbelt, extending into the Gascoyne. It has a high cineole oil, coppices well and has good brushwood potential. It occurs on acidic loamy sands and duplex soils.
- *Melaleuca zeteticorum* is a salt tolerant, spreading species which extends from the central wheatbelt to the goldfields. It occurs on the margin of salt lakes and across red sandy loam plains. Usually low growing with poor form, it has high oil content in the leaves.
- *Melaleuca interioris* is a spreading shrub of the arid interior, growing from Wiluna east towards central Australia.
- *Melaleuca exuvia* is a poor shrub or small tree restricted distribution east of the Wheatbelt. Its salmon coloured peeling papery bark give it exceptional potential as an ornamental plant for the arid zone. Grows in sand soils on the margins of salt lakes.
- *Melaleuca vinnula* is a small flat leaf shrub from the central to eastern Wheatbelt. It grows on clayey sands.

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The details provided in this information sheet have been collated from the best available information at the time of writing. Please check with a reputable revegetation advisor prior to making any decisions based on the information presented here.



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