

Engineered Woodlands Project Species Selection

The Engineered Woodlands Project aims to demonstrate a profitable land use that integrates the growing of trees for carbon and timber within agricultural production systems. Engineered woodlands are paddock-wide tree plantings where the trees are wide-spaced and designed to allow grazing and the efficient use of machinery for normal management. They provide improved shade and shelter and a diversity of other NRM outcomes over current pasture-only land use but do not displace pastures and livestock.

The species utilised for an engineered woodland will be determined by the site conditions and the establishment method. Where the woodland is established with each tree belt being fenced to protect the seedlings from livestock, then any of the wide range of species typically grown in other landcare style plantings are suitable.

This article deals only with those species suitable for rapid establishment where the aim is to avoid any fencing costs by de-stocking the whole paddock, growing the seedlings to stock-proof size as quickly as possible, before resuming grazing as normal. Normally under best establishment practice this should take two growing seasons for sheep grazing (i.e. 18 months if established in spring). The following species are capable of achieving 2m plus height growth in this time on favourable* sites.

*Unfavourable sites: Generally on the Tablelands tree establishment (with the possible exceptions of a few exotic deciduous tree species) is slow and/or poor on lower slope positions, black soil flats and anywhere with poor or impeded drainage. Certainly none of the tree species with any commercial timber potential can be grown satisfactorily on such sites.

Potential Timber Species

Radiata Pine *Pinus radiata*

The most extensively established plantation timber species of the Northern Tablelands, principally in State Forests plantations but also widespread as farm plantings. Utilised in the current Engineered Woodlands Project.

Pros: Grows well on a wide range of sites from sandy soils to chocolate basalt, highly frost tolerant. Excellent as a windbreak tree if branches are maintained down to ground level. Has excellent form (good straight stems with strong apical dominance). Utilised for a wide array of products from veneer and furniture down to pulp – marketed locally mostly for treated landscape logs and timber. The only species of those listed that has been successfully planted on farms of the region and then grown, harvested and the products marketed.

Cons: Slow growing as a seedling relative to the species listed below,

Below: An early engineered woodland on "The Hill" Kentucky with a mixed planting of Radiata Pine for timber and Snow Gum, Manna Gum and Silver Wattle for biodiversity.



needs good fertility and thorough weed control to ensure growth to 2m in 18 months. Since it is an exotic species, is less desirable for biodiversity conservation and often disliked aesthetically.

Shining Gum, *Eucalyptus nitens*

A southern Australian species with a natural distribution in high rainfall environments extending from Tasmania to the higher points of the Barrington Tops and areas around Ebor. Utilised in the current Engineered Woodlands Project.

Pros: Probably the fastest growing tree species suitable for the Northern Tablelands – capable of exceeding 2m in height in one growing season, has good frost tolerance, grows well on a variety of sites but prefers deeper and

Below: Shining Gum near Armidale, age 6 years.





Above: Shining Gum seedlings growing at Woolbrook in the current Engineered Woodlands Project aged 5 months.

better soil types. Has good form and commercial timber prospects.

Cons: Only recently trialled on farms of the Northern Tablelands, long-term environmental tolerances have yet to be confirmed as a farm planted tree. Intolerant of poor drainage. Intolerant of extreme frost. Drought intolerant – not suitable for very free draining soils or shallow soils. Requires adequate fertility and excellent weed control to express its rapid growth potential.

Manna, Ribbon or White Gum,

Eucalyptus viminalis

Naturally distributed from Tasmania to the Northern Tablelands of NSW (where it is widely distributed and common). Widely grown in environmental plantings throughout the New England. Utilised in the current Engineered Woodlands Project.

Pros: Known to cope in even the toughest conditions of cold and frost on most soil types. Fast grower. Timber harvested from local native forests

Below: A 3 year old Manna Gum in a planting near Hillgrove.



is currently processed and marketed as flooring – i.e. has commercial prospects.

Cons: Often has poor form in farm planting situations. Requires considerable selection and breeding for good form. Is targeted by scarab beetles and is often completely defoliated almost annually in the worst beetle areas such as the Salisbury Plains.

Forest White Gum, *Eucalyptus nobilis*

Closely related to *E. viminalis* but naturally occurs in tall forests in areas of higher rainfall, otherwise similar in most respects. Less frost tolerant but usually of better form, may be a better option on more favourable sites. The timber is currently harvested from native forest for the same market as *E. viminalis*. Utilised in the current Engineered Woodlands Project.

Sydney Blue Gum, *Eucalyptus saligna*

An east coast species with a natural distribution that includes high elevation sites on the eastern parts of the Tablelands as far west as Wards Mistake, Hillgrove, Enmore, and the Winterbourne areas. Being trialled on a few sites in the current Engineered Woodlands Project.

Pros: Grows in a variety of soils. Fast grower with good form. A well recognised and even sought after species with the timber harvested and marketed throughout eastern Australia including locally (from native forests). A very attractive grand paddock tree.

Cons: Tolerant of moderate frost only and is therefore likely to be restricted to mid to upper slope positions on the Northern Tablelands. Should only be spring planted.

River Oak, *Casuarina cunninghamiana*

Naturally occurs besides streams both on the western and eastern fall of the Tablelands. Utilised in the current Engineered Woodlands Project.

Pros: Usually of excellent form. A nitrogen fixer and has been demonstrated to actually lift pasture productivity when grown at low density in pasture paddocks. Tolerates wetter sites better than the other species listed.

Cons: Intolerant of extreme frost,

drought intolerant. Has attractive timber but is not well known to the market. Foliage and bark attractive to livestock, is at risk from bark chewing – not suitable for set stocking, best utilised in rotational grazing systems with short graze periods.

Other species with some potential for particular sites include: Brown Barrel *Eucalyptus fastigata* (basalt sites), Messmate *E. obliqua* and Silvertop Stringybark *E. laevopinea* (most soils). All these require well drained soils on upper slope and ridge positions (will have stunted growth anywhere else), are only moderately frost tolerant. As stringy barks are at risk from bark chewing by livestock – not suitable for set stocking, best utilised in rotational grazing systems with short graze periods.

Species for Biodiversity, Shelter and Carbon

Snow Gum, *Eucalyptus pauciflora*

A common species on the higher parts of the tablelands, grows on a variety of soil types, very frost tolerant, has rapid early growth. A mainstay of the current Engineered Woodlands plantings due to its toughness and adaptability.

Mountain White Gum *E. dalrympleana*

Relatively common local species, similar in appearance and habit to Manna Gum, tolerant of conditions in the lower parts of the landscape. Poor timber quality.

Silver Wattle *Acacia dealbata*

& Fern Leaf Wattle *A. filicifolia*

These two wattles are common local species which grow rapidly into small trees (and therefore out of the stock browse line), they fix nitrogen and provide habitat diversity in plantings that would otherwise be dominated by eucalypts. Fairly frost tolerant for acacias, intolerant of poor drainage, short lived (10 – 30 years depending on site quality).

Acacia diphylla

A long lived species (50 years +) which grows slightly slower than the above wattles, but to the same height (10m). Needs good fertility and thorough weed control to ensure growth to 2m



Above: A 5 year old *Acacia diphylla* showing excellent dense crown development for stock shelter.

in 18 months. Only moderately frost tolerant but is very drought tolerant. An excellent shelter tree has a dense crown from ground level to the upper canopy when open-grown (although the lower leaves will be browsed by livestock).

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Engineered Woodlands Project – initiative of the Northern Inland Forestry Investment Group (NIFIG) a sub-committee of the Northern Inland Regional Development Board – Co funded by the Board, the Namoi CMA for sites within the Namoi catchment and the Border Rivers-Gwydir CMA for sites within the Gwydir catchment.

Contact the NIFIG – Shane Andrews, Project Co-ordinator 0427 753808, David Thompson, Project Manager 0419 681 818.



Engineered Woodlands Field Day

Carbon Rich Agricultural Systems

9a m to 3:30 pm Wednesday 28th May 2008
Hosted by Justin Kirkby, "Glen Avon" Gravesend

- Engineered Woodlands – What are they?
- How much carbon is there in the soils and vegetation of different land uses in the mixed farming zone of NSW – crops, pastures and woodlands?
- The state of soil carbon monitoring in the BR-G catchments.
- The engineered woodland on Gary and Linda McDouall's property "Yarraman" and land use changes that are increasing carbon in the wider landscape of "Yarraman".
- The opportunities for generating income from woodland trees and the state of the carbon and timber markets.
- Incentive programs to encourage the adoption of carbon-rich agricultural systems.
- Information displays on Dorper sheep, sub-tropical pastures, natural resource management, engineered woodlands, the BR-G CMA and Landcare.
- Field visits to the Glen Avon engineered grassy woodland and sub-tropical pastures.

BBQ lamb lunch provided courtesy Amarula Dorper stud "Glen Avon". For more information and to RSVP by Friday 23rd May, please contact Shane Andrews at shandrews@bigpond.com or Southern New England Landcare on 6772 9123 or mail@snelcc.org.au.

The Soil Health Forum *Stage 2*

9am to 5pm Friday 23rd May 2008, Uralla Memorial Hall

All are welcome to this FREE event!

Discussion will centre around areas of interest identified by landholders who attended SHF Stage 1 in Uralla last November:

- Carbon Farming
- The broadacre use of Composts and Compost Teas
- Grazing Management
- Pasture Cropping
- The Implications for Human Health in farming humus depleted soils.

Lunch and other refreshments will be provided, and there will be an innovative guest speaker contributing to an informal, information-sharing atmosphere.

We are concerned with practical and affordable landholder-driven solutions so please come and be part of proceedings!

RSVP (for catering purposes) by 19th May to SNELCC on phone 6772 9123.