



Choosing the right tree

Considering the opportunities and risks of choosing either well-established species or less common timber species that provide access to smaller, specialty markets.



There are many species to choose from when considering forest plantings. Trees such as *Pinus radiata* are well established production species in New Zealand with a body of knowledge on genetics and silviculture and a ready market. Others are less common and have more unknowns, but provide access to small, specialty timber markets.



Pinus radiata

Radiata pine makes up more than 90% of New Zealand planted forests. It is generally cheaper to establish and more reliable than less common tree species, lowering investment risk compared with the alternatives. This in part is due to the reliable health and growth of the species as well as the familiarity of forestry consultants and contractors with its requirements.

P. radiata is usually either grown to produce high value clear timber or structural timber with small knots. The choice between clearwood and structural regimes depends on a number of factors including site, harvesting and transport costs.

The major advantages of *P. radiata* regimes compared with other species is strong reliable growth and its market dominance. Strong growth characteristics means it is less likely *P. radiata* will suffer from poor health, and rotations are shorter, improving returns. And because the species is so common, all forest contractors are familiar with its management requirements, and it is reasonable to expect established log markets at harvest.

Douglas-fir

Douglas-fir make up 6% of planted forests in New Zealand. It is mostly grown in the South Island, particularly in Otago and Southland, due its ability to better withstand snow damage and to the lesser disease effect in lower temperatures. Douglas-fir has been significantly affected by Swiss needle cast which can reduce growth an average 35% in the North Island and a 23% in the South Island.

Douglas-fir timber has good stability after drying, less variable wood properties, greater stiffness and some inherent natural durability. With structural timber its primary market, there are generally no pruning costs. Branches are controlled through higher stocking rates. In areas suitable for good Douglas-fir growth it is considered a resilient and low maintenance production forest species. The rotation length is 40 years on average.

There can be an environmental consequence from establishing new Douglas-fir forests. The species can regenerate vigorously, particularly in lightly grazed grassland or scrub areas and become an invasive pest or 'wilding'. It is also very shade-tolerant and can regenerate under existing vegetation.

Cypresses

The cypress species commonly grown in New Zealand are *Cupressus lusitanica* and *C. macrocarpa*. *C. lusitanica* is less well-known but produces timber similar to macrocarpa. Despite macrocarpa being more common and more popular in the marketplace, *C. lusitanica* is generally recommended for planting because it is more resistant to cypress canker infection.



Generally one of two strategies are used growing cypresses; one that produces large diameter clearwood logs, and one that produces smaller logs but high total volume with small branches. Both types of logs can be sold either domestically or exported. A trade-off must be decided on by the cypress grower early in the forest rotation; to aim for premium, larger diameter logs for local use at the expense of total log volume, or to aim for a higher number of small logs that will produce more product and do well in the export market competing with radiata pine, but might not be as suitable for small scale local sawmilling.

Cypress timber is popular locally for its appearance in uses such as furniture. However, the cypress market suffers from demand and supply issues, as there is no steady supply of cypress logs to support the industry. For this reason, there are no large scale mills in New Zealand set up for cypress logs and it can be difficult to find a domestic buyer at harvest.

Coast redwood

Coast redwood (*Sequoia sempervirens*) is native to the Californian coast in North America where it is a favoured timber species, especially the heartwood, which is naturally durable for above ground outdoor use. The old growth coast redwood forests that provide the best quality timber are diminishing and are increasingly controlled for conservation. The re-growth of younger redwood trees is now the standard source of redwood timber in North America.



The large redwood market is a good opportunity for New Zealand-based foresters. Redwoods grow well, although growth is more sensitive to environment than *P. radiata*. Care should be taken to grow them in generally sheltered, free draining sites. The timber quality produced in New Zealand is similar to that of North American redwood re-growth forests.

There has been considerable investment in redwoods in the last 15 years, including north Canterbury and significant areas of the Whanganui and Manawatū regions.

Predicting the value of future redwood logs is difficult as the few small pockets of redwoods at harvest age in New Zealand are insufficient to support a stable log market. It is also difficult to predict how the lack of supply in North America will affect demand but the American market has potential to provide good returns.

There is no standard practice for redwood harvest and re-planting as most New Zealand plantations have not reached harvest age. Redwoods have the ability to coppice (i.e. to sprout fresh growth from the stump of a harvested tree). Alternative harvesting and planting systems such as selective harvest and continuous cover forest systems have potential and would reduce or remove the period of time between forest rotations where the land is most vulnerable to erosion. However, full coppicing rules out the potential for genetic improvement, so in the long term a mix of coppicing and planting is likely.

Eucalyptus fastigata

Ash eucalypts from the southern parts of Australia, have been grown in New Zealand since the 1800s. *Eucalyptus fastigata* has been most commonly grown recently due to disease resistance and timber properties.

E. fastigata is primarily grown for pulp for use in specialised paper products such as high gloss magazine paper. However, it can also provide sawlogs for high value uses such as flooring and furniture.

E. fastigata pulpwood can be grown quickly, but pulp logs are not as valuable by volume in comparison to sawlogs. Terrain, proximity to pulp mills and scale are important factors in determining profitability for pulp regimes. *E. fastigata* forests for pulpwood production can also make good returns from carbon credits due to fast volume growth. Pulp mills provide an established market, but are always looking for the cheapest price and are located primarily in the Waikato and Bay of Plenty regions. The small log size from a pulp regime makes them suitable for firewood if no buyer can be found at the right price.

Growing *E. fastigata* for sawlogs is another option. It requires careful sawing soon after harvest, and careful drying to produce defect-free straight timber boards. Only small volumes of eucalypts are harvested in New Zealand and saw millers and markets can be difficult to find.

Of the hundreds of *Eucalyptus* species and varieties, *E. nitens* is a good option where fast growth is the main priority. However, this species will require more disease control, particularly in areas with mild winters. Other species such as naturally ground durable species can be grown for specialised markets such as organic vineyards where treated timber is not desirable.

Poplars

Poplars have long been promoted for hill country stabilisation and are favoured because they are simple to establish, and allow pasture farming in between trees. There are many varieties of poplar to choose from, with varying characteristics such as growth, suitability for stock fodder, disease resistance and timber production. Growth rates for poplar are good and 20-year rotations are possible.

The best markets for poplar are industrial uses due to the resilient nature of the timber making it suitable for uses like truck decking and work benches. Poplars can provide a good timber investment, as well as providing other forest benefits, if a buyer is found.

Natives

A number of New Zealand native species are promising for timber production. Most is known about kauri and tōtara. Kauri shows potential for good growth rates and excellent timber properties for high value uses such as cabinetry. Tōtara has good growth and timber properties, although the timber is slightly soft. The main advantage for tōtara is that it regenerates naturally on farms, particularly in Northland, so there is already a large quantity that could be used to start a new timber industry (an idea supported by the Northland Tōtara Working Group).

The common aspect across native species is that more research is needed. Native timber species are not commonly planted. As a consequence the timber supply is limited and it may not be easy finding a market.

In summary

Radiata pine is not a good option in some situations. Commercially, Douglas-fir is preferred on higher-altitude sites; *Abies grandis*, *Pinus ponderosa*, *Pinus nigra*, and *Sequoiadendrum giganteum* are other options on these sites. For wetter sites, *Taxodium distichum* and *Picea sitchensis* could have potential. Research is also underway on durable eucalypts for dry sites. Growth is expected to be lower and rotations longer on these more difficult sites, which will lower the profitability of timber production and increase the risk of damage due to winds, flooding or fire.

From a carbon farming perspective, as long as the trees are successfully established and the area is less than 100 ha, the

MPI lookup tables can be applied. Currently (2018), these offer a single table for all softwoods other than radiata pine and Douglas-fir, and another for all hardwood species. The tables for Douglas fir and other softwoods assume lower carbon sequestration than would be achieved by radiata pine, so a successful alternative crop may reward the use of the Field Measurement Approach. Research is being conducted on alternative species including natives to provide carbon lookup tables for other species.

Ultimately, the choice of species will come down to the safety of radiata pine versus a more uncertain alternative. For many, the appeal is in trying something different and there are plenty of enthusiasts who will go the extra mile with advice and support when something other than pine is involved.

Funder

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Essential references and links

New Zealand Farm Forestry Association has extensive literature on species mentioned here and many others:
<http://www.nzffa.org.nz/farm-forestry-model/species/>

The New Zealand Dryland Forests Initiative has information about round durable eucalypt species:
<http://nzdfi.org.nz/>

See the Poplar and Willow Research Trust for more information about these trees:
<http://www.poplarandwillow.org.nz/>

For New Zealand native tree species for timber production see the Tāne's Tree Trust' species profiles:
<http://www.tanestrees.org.nz/species-profiles/>

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