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WESTERN AUSTRALIA

Pine Trees for Timber under W.A. Conditions

by Richard Moore, Roger Edmiston,
Paul Brown and Peter Beatty

Introduction

While pines are not new to Western Australia, more are being planted, many beyond their traditional range — into areas of lower rainfall, higher summer evaporation, more intense sunshine and poorer soils. The two species involved are *Pinus radiata* (radiata or Monterey pine) and *Pinus pinaster* (pinaster or maritime pine). These pines are being planted as plantations or windbreaks, or in agroforestry, for purposes ranging from timber production to prevention of land degradation.

This Information Sheet provides general recommendations about pine planting for timber production, and more specific guidance in choosing species. It offers farmers and investors information about where, outside State forests, pines can be grown reliably.

As a general rule pines can be planted as commercial plantations in the higher rainfall areas and more fertile soil types, as agroforestry combinations in the medium rainfall and fertile soil areas, and only as windbreaks in rainfall down to 400 mm on deep sandy soils. Nominating boundaries is not an exact science, however; there are small areas outside these zones with favourable soils and adequate rainfall or moisture.

Species

Experimental plantings of various pine species have demonstrated that there are two main species of pine which can be grown for timber in the south-west of Western Australia. They are *Pinus radiata* and *Pinus pinaster*.

Radiata pine is indigenous to the coast of California and several off-shore islands. The species is of little commercial value in its native country, but it has become an important timber tree in several countries to which it has been introduced: notably Chile, New Zealand, Australia and South Africa. It requires a well

drained loam or sandy loam for good growth. The main advantage of the species is its rapid growth on a range of site types in temperate Australia. Although its wood is light (about 500 kilograms per metre, air dried) and soft, it is used for a range of purposes, especially in building.

Pinaster pine is a native of the Mediterranean region from the shores of the Atlantic in France and from Portugal to Greece. It thrives on light and well drained soils, particularly those of considerable depth. An important use of the tree in Europe is turpentine and resin production. Its wood is moderately heavy (about 600 kilograms per cubic metre, air dried), fairly hard, coarse grained and resinous. It has many uses including general construction and poles.

Further information on wood properties and utilisation of pine can be found in a Department of Conservation and Land Management (CALM) pamphlet entitled 'Using Pine Timber'.

Method of Growing Pine

Plantations

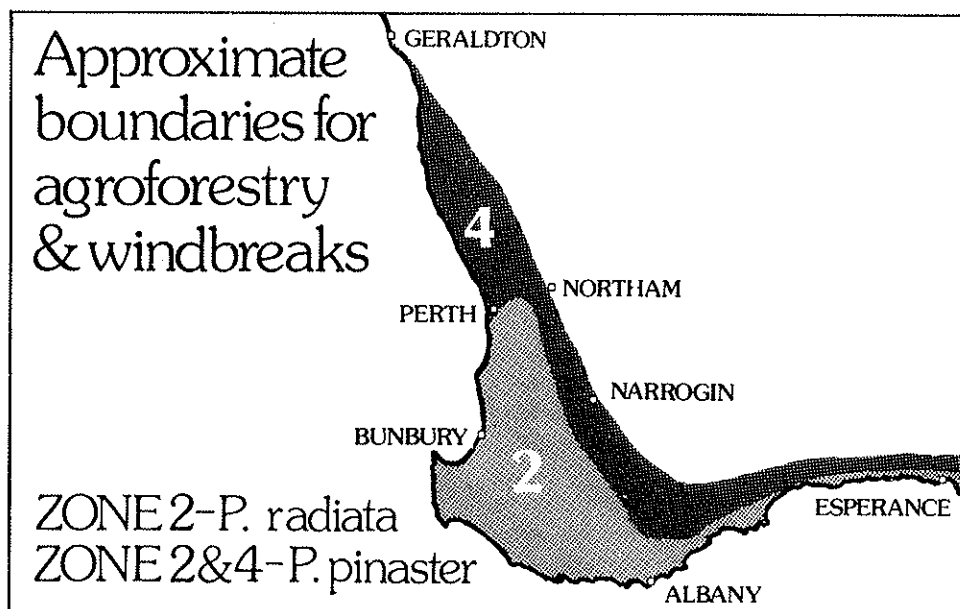
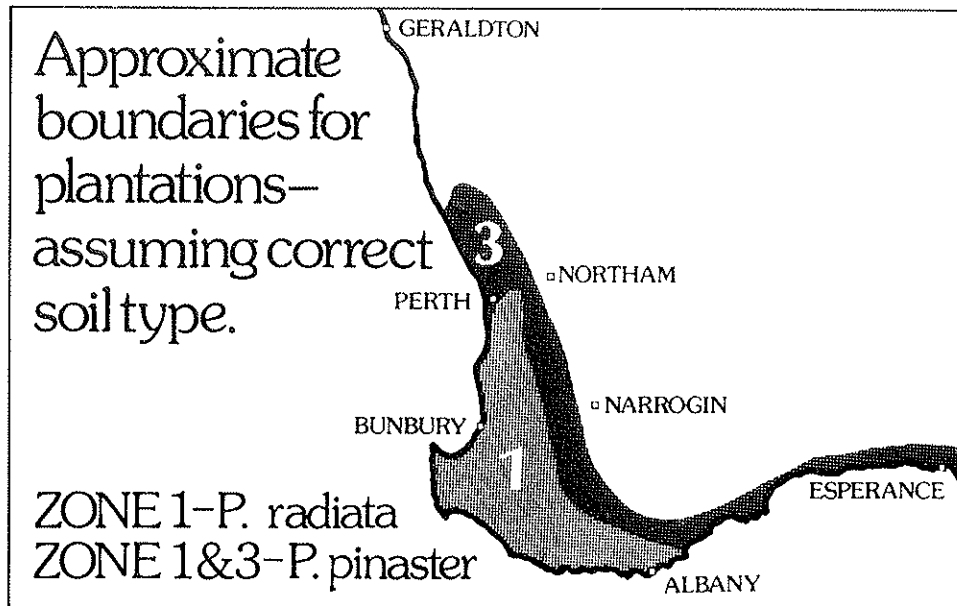
The traditional method of growing pine for timber is in a plantation. Similar to cropping, this allows close spaced trees to produce maximum timber volume. Periodic selective thinning of smaller sized trees is necessary before a final crop of large trees is produced.

Wide-spaced Agroforestry

Growing pine at wide spacing for timber requires more work (pruning) per tree, but has the advantage that trees grow more quickly, and therefore reach saleable size sooner than trees in plantations. The extra space allows cropping and grazing to be carried out in conjunction with timber production. (See CALM pamphlet 'Agroforestry — an Alternative Approach to Farming').

Windbreaks

Pines are ideal for windbreaks because they are tall and retain much of their foliage to ground level. In suitable



Species	Purpose	Zone	Minimum Rainfall Requirements	Soils
<i>P. radiata</i>	Plantations	1	750 mm/year for areas of high summer evaporation. 600 mm/year for low summer evaporation.	Suitable soil types for both species are moisture retentive (not waterlogged) yellow sand, gravel sands and loams. The soil should be penetrable to a depth of at least 60cm increasing to more than 1m in lower rainfall zones. <i>Pinus radiata</i> responds to a more fertile soil.
	Agroforestry & Windbreak (inc. timber)	1,2	650mm/year for areas of high summer evaporation. 500mm/year for low summer evaporation.	
<i>P. pinaster</i>	Plantations	1,2,3	600mm/year for areas of high summer evaporation. 500 mm/year for areas of low summer evaporation.	
	Agroforestry & Windbreak (inc. timber)	1,2,3,4	500 mm/year for areas of high summer evaporation. 450 mm/year for areas of low summer evaporation.	

areas pine windbreaks can be managed (pruned) to produce saleable timber as well as shelter.

Limits to Growth of Pine

Radiata Pine

The Department of Conservation and Land Management's plantations of radiata pine are confined mainly to areas south of Perth with at least an average annual rainfall of 750 mm, on loamy or yellow sandy soils. Trial plantings have been carried out in State forest north of Perth, but growth rates have been superior to pinaster pine only in the first few years of growth. In addition, radiata pine has a higher nutrient requirement and has suffered from sunscald.

Pinaster Pine

Pinaster pine is more drought resistant than radiata pine, and will grow on a lighter soil.

Research into the potential of pinaster pine to be grown in plantations between Gnangara and the Moore River showed that plantations would be susceptible to drought, unless thinned in the early years (Havel, 1968). These non-commercial thinnings, however, would lower the amount of timber for harvest and this, combined with increased haulage costs, would reduce profits. North of Moore River rainfall decreases and summer temperatures increase, and pinaster pine plantations would be even more susceptible to drought.

Pinaster pine can be grown with an average annual rainfall of 400 mm per year but it is unlikely that it would produce saleable timber in such areas.

Other Considerations

Distance from Market

The location of the proposed plantation in relation to future markets or processing centres must be carefully considered. Freight costs on logs and sawn timber are considerable and have a major effect on the net return to the grower.

Fire risk

The risk of fire cannot be overlooked in the selection of a planting site and consideration should be given to the likelihood of fire from neighbouring properties.

Undeveloped land is obviously the greatest hazard. It is vital that the plantation site can be kept under close observation during the summer months for the early detection and suppression of fires.

General Comments

Solitary or widely spaced trees of any species may appear healthy on a particular site, but this does not necessarily indicate that the site can support the same species to maturity under competitive plantation conditions.

Young trees on poor sites can be misleading in that they may grow quite vigorously at plantation densities for the first five or six years, but then slow down or stagnate as competition between the individual trees becomes critical.

CALM has determined the zones shown in the table and the map based on the best information available. There will be unsuitable sites within these limits due to soil type etc., and growth rates will decrease with poorer soils, shorter growing seasons and higher solar radiation. This will result in a longer period to attain commercial or useful size.

The higher rainfall requirements are for areas of high summer evaporation. Close to the south coast (Albany to Esperance) where summer rainfall, higher humidity and cool sea breezes lower the evaporation rate, pine can be grown on lower rainfall.

The maps show approximate boundaries for wood production under four categories:

- | | | |
|------------------|---|---|
| Zone 1 | — | <i>P. radiata</i> in plantations. |
| Zone 2 & 1 | — | <i>P. radiata</i> in agroforestry stands and windbreaks. |
| Zone 3, 2, 1 | — | <i>P. pinaster</i> in plantations. |
| Zone 4, 3, 2 & 1 | — | <i>P. pinaster</i> in agroforestry stands and windbreaks. |

There will be unsuitable soils within these zones. As a general rule growth rates will be lower with poorer soils, shorter growing seasons and higher intensity sunshine. The slower the growth rate the longer it takes to obtain commercial or useful size.