

# A PLANTATION SIMULATION MODEL FOR RADIATA PINE

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## ABSTRACT

Measurements from all the Company's spacing and thinning trials have been pooled, growth models calculated and a programme called PREDICT developed which simulates stand development, estimates assortments, growing costs, net present values and mean harvesting costs for various thinning schedules and rotations. Each thinning can be nominated as to age and intensity of thinning on the basis of either thinning to a residual basal area or to a volume to be cut per acre.

Options on thinning type enable simulations of "mechanical" thinning (all diameter classes), thinnings from "below" (small diameter classes), thinnings from "above" (large diameter classes), or a combination of mechanical with either "below" or "above" as would occur for example in a thinning involving removal of rows for access and selection thinning.

A series of runs on this model within the bounds of the data used indicate that *Pinus radiata* is a very flexible species.

- (i) Type of thinning does affect final crop tree size but does not greatly affect growing costs or volume production;
- (ii) As thinning intensity is raised volume production is lost but this does not affect growing costs greatly as the economic benefit from larger earlier returns compensates for lower productivity where thinnings are heavy;
- (iii) Net present values fall as stocking per acre is increased although volume production rises;
- (iv) As rotation age is increased to 20 years, volume production rises steadily while harvesting costs fall rapidly. Extrapolating the data beyond 20 years indicates a maximum net present value at 30 to 35 years.

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