

BREEDING for profit

Research by an ensis team has provided data on how selection for particular traits in radiata pine breeding programs will affect the profitability of forest enterprises.

A key finding by Dr Harry Wu and his colleagues in Canberra is that improvements in quality traits such as wood stiffness are likely to have a bigger impact on the bottom line than further gains in tree growth rates.

The researchers obtained information on the influence of different biological traits on profits through discussions with the Southern Tree Breeding Association (STBA) Pine growers, and a study of their production and processing systems. They looked at all stages of the solid timber production process – from tree planting, to thinning, to sawmill, and marketing. The companies involved were Hancock Victorian Plantations Pty Ltd, ForestrySA, Auspine Ltd, Green Triangle Forest Products Ltd, Treecorp Pty Ltd, AKD Softwoods, Norske Skog Paper Mills (Australia) Pty Ltd, Midway Plantations Pty Ltd and Horizon2 Ltd (New Zealand). The study was supported by the Forest and Wood Products Research and Development Corporation and STBA.

“By linking biological traits with timber production systems, we were able to gain an understanding of the economic importance of each of them,” Dr Wu says. “From that we developed an economic production model for each company. From the model, we can calculate profits for improvement of each breeding trait.”

For integrated plantation and sawmill companies, modulus of elasticity (or wood stiffness) turned out to be particularly important: a 10% improvement would increase the NPV return from a one-hectare plantation by about \$1,100. This compares with around \$900 for a 10% gain in growth rate (mean annual increment) and much lower figures – about \$350 and \$200 respectively – for equivalent improvements in maximum branch size and stem straightness.

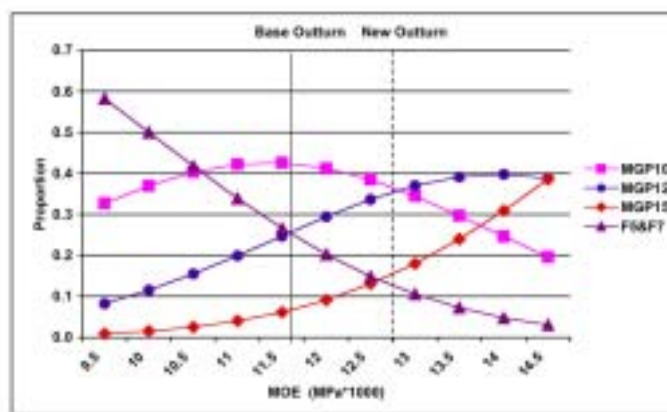
The team’s findings – for plantations and sawmills on their own, as well as integrated operations – mean a dollar value can now be placed on individual traits, Dr Wu says. “This is a major advance for tree breeding programmes.”

In a second part of the project the researchers looked at a key issue for breeders – the relationship between early selection criterion traits and breeding objective traits for solid timber (the properties of harvested trees that affect profits of forest enterprises).

They found that modulus of elasticity and other important quality traits – wood density and microfibril angle – have a higher heritability and age-age genetic correlation than the growth traits traditionally emphasised in tree breeding. “So early selection for wood quality should be very effective,” Dr Wu says.

He expects further work will assist the application of economic evaluation methods in radiata pine breeding programmes for both solid timber, and pulp and paper production in Australia and New Zealand.

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Effect of improvement in modulus of elasticity (MOE) on proportions of machine-graded pine (MGP).