

Eucalyptus nitens breeding

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The current status of *Eucalyptus nitens*

- Short rotations of 15-20 years for pulp wood production
- At above 20m³/ha/year MAI
- Outstanding growth rates, good form and cold hardiness
- Southland is the main production area



Eucalyptus nitens for pulp wood production

- Three cycles of breeding based on progeny testing regards to *E. nitens* as a resource for pulp wood production
- The current breeding strategy is open pollinated breeding population using forward selection
- Three clonal and two seedling seed orchards and two clonal breeding archives established during 1999-2001 that are currently used for seed production

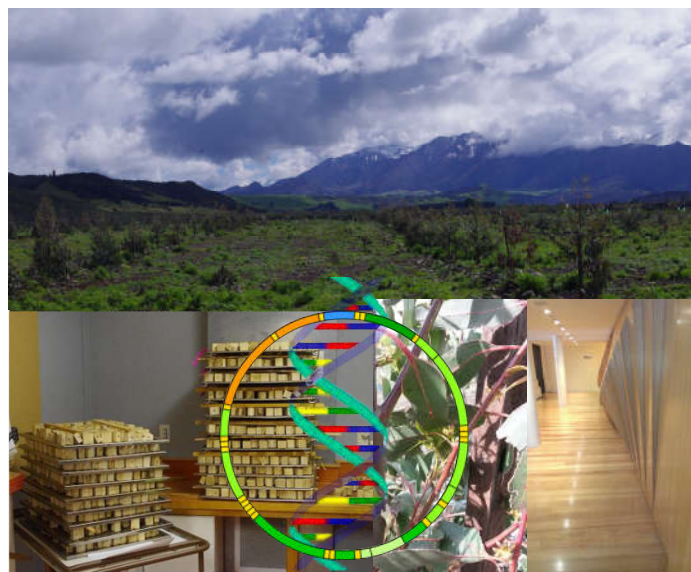


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Specialty Wood Products Research (SWP) in *E. nitens*

- Breeding for high value solid wood products
 - Wood property study
 - Genetics of pest resistance & biocontrol
 - Genomic selection
 - Selections for new seed orchards



Wood property study and genomics

- A third generation progeny trial,
- Assessment at age six years for growth and form, and wood density



Wood property study and genomics

- Assessment at age seven years of wood quality traits and DNA for genotyping



Growth and form are heritable

Diameter at breast height	Low to moderately heritable
Height	Low to moderately heritable
Stem straightness	Moderately heritable
Wood density	Moderately heritable

Wood properties are heritable

Radial wood shrinkage	Moderately heritable
Tangential wood shrinkage	Moderately heritable
Wood stiffness	Low to moderately heritable
Growth strain	Low to moderately heritable

Sapwood and heartwood internal checking are moderately heritable



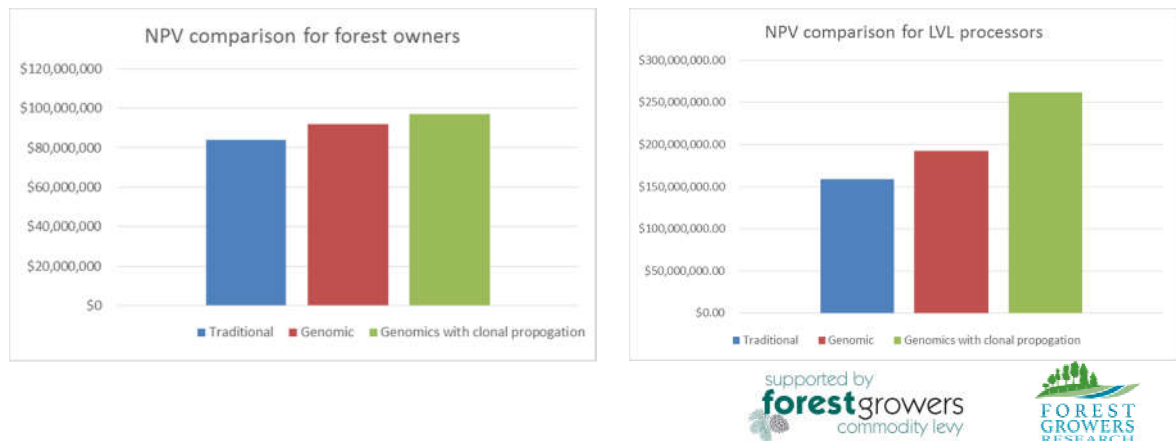
Resistance to *Paropsis charybdis*

- First indications to select for more resistant genotypes
 - Susceptibility to *Paropsis* chewing is heritable
- A biocontrol method is being developed by Toni Withers, Scion Forest Protection Team



Genomics will improve the net present value for forest growers and end users

The business case analysis in *E. nitens* (Damian Corbett 2016)



New seed orchards

- 46 best genotypes were selected
 - 11 genotypes were selected for both solid wood and pulp orchards



New seed orchards

- South Wood Export Ltd - two production seed orchards with emphasis on wood quality
 1. A focus on volume and wood density for pulp wood production
 2. Featuring selections with low wood shrinkage, low growth strain and internal checking for solid wood production
- A volume and wood density seed orchard was also established for Proseed



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Conclusions

- There is considerable scope for genetic improvement in the wood properties of *E. nitens*
- Genomic selection will target for more specified selections - as the next step, it can be used for genetic thinning of seed orchards and to establish breeding archives
- New genetic material for pulp and enhanced solid wood properties will start to become available for commercial planting in the next five years

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Conclusions

- Growers can expect that their forests produce more suitable material for solid wood production with less ill-effects from fast growth
 - Improved material is also adapted for the decades in the NZ environment
- More profits for solid and pulp wood processors



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