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# SPECIALTY WOOD PRODUCTS PROGRAMME UPDATE

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## Highlights

*Eucalyptus fastigata* LVL made at JNL would produce 30% LVL16 and 70% LVL13. This is significantly higher than typical radiata LVL stiffness.

Taper and volume equations for all stem components (bark, sapwood and heartwood) of *E. globoidea* were developed which will allow for inventory predictions. These equations also allow for the estimation of heartwood volumes which is the more valuable component when growing naturally durable wood.

Screening of cypresses using cores showed a wide range in heartwood % within hybrids/clones offering selection and breeding potential.

## RESEARCH PROGRESS: Q1 Year 7

### Non-durable eucalypts

Laminated veneer lumber (LVL) has successfully been produced in a commercial radiata pine mill (JNL Wairarapa) using veneers from 23-year-old *Eucalyptus fastigata*. The veneers were glued successfully using one of the glue formulations commercially used by the mill, to produce 24 LVL panels (1.2 x 2.4m), 40mm thick. Image below shows the veneer infeed (colour coded by log/stiffness grade).



Mechanical testing of the LVL found that:

- With the exception of shear strength, the 95x40 *E. fastigata* LVL overall achieved the LVL 13 grade as limited by bending

stiffness, with the other strength properties meeting or exceeding the highest LVL16 grade.

- Accurate measurement of veneer stiffness was found to be a very good predictor of final bending stiffness but not that reliable in predicting the strength properties.
- It is estimated that the LVL would produce 30% LVL16 and 70% LVL13. This compares with Radiata pine LVL commonly falling into LVL8, 10, 11 & 13 grades.

Further exploration using veneers cut from solid timber and then laminated to produce an LVL 'similar' product showed high shear strength, well in excess of the code requirements. This suggests that the poor shear behaviour is a result of the processing conditions, rather than a characteristic of this species.

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The two third-generation of *Eucalyptus nitens* progeny tests (Keen's block and Fortification) were screened for diameter at breast height, stem height, wood density, stem straightness and malformation. In total, 5,753 individuals were phenotyped from which 1,011 individuals were genotyped. The key outcome from this research is the ability to predict genomic breeding values for non-phenotyped individuals and parents using single-step genomic evaluation, especially for traits associated with costly phenotyping such as



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wood density. Considerable genotype by environment interaction in growth attributes were seen but there was a lower GxE interaction for wood density. Most growth traits were strongly correlated while growth and wood density were only weakly correlated.

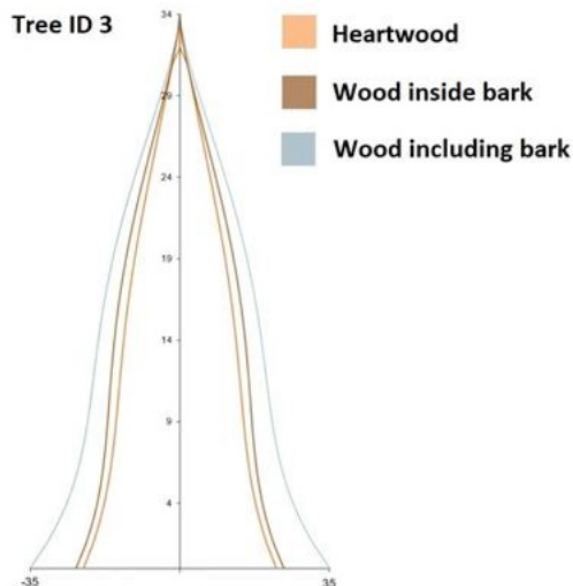
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## Naturally durable eucalypts

Taper and volume equations for all stem components (bark, sapwood and heartwood) of *E. globoides* were developed. Taper equations allow forest managers to estimate dimensions of logs that can be cut from stems in their forests when they have measured diameters at breast height and heights of trees in inventories. Photo below shows the heartwood, sapwood and bark thickness of *E. globoides*.



These equations also allow for the estimation of heartwood volumes which is the more valuable component when growing naturally durable wood. This figure below shows an individual tree equation with diameter in cm on the x-axis and height in m on the y-axis.



## Cypresses

Heartwood is a highly desirable attribute for cypress timber, particularly if installed outdoors. A number of cypress clones and hybrids from the National breeding programme have been screened, and as a result of this work, the Farm Forestry Association identified a number of selections and clones under test on its members properties, and a small number of *Cupressus lusitanica* clones under test with Timberlands. Trees at 3 sites were cored (photo below shows Waiareki site near Taupo). Most of the *C. lusitanica* clones appear to have similar range of heartwood % to previous reports, and in general *C. macrocarpa* at matching ages has 10 to 20% more heartwood. On the Timberlands trial the *C. lusitanica* heartwood % amounts hybrids/clones ranged from 9 to 60%.





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## Regional business cases

Hawkes bay: There was a poor response to a Hawkes Bay woodlot owner survey probably in part due to the use of postal mail rather than email (as email addresses were not available). The ongoing task for Stage 2 of this project is for work to continue at the School of Forestry to develop a mapping approach that automatically classifies alternative species.

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## Reports and other outputs completed

Report No.	Document Title
SWP-T133	National forest owner survey and resource inventory of alternative species – Stage 2
SWP-T134	Developing fully compatible taper and volume equations for all stem components of Eucalyptus globoidea
SWP-T135	Producing High-stiffness LVL from Eucalyptus fastigata: Part 3. LVL production and mechanical properties
SWP-T136	Multi-environment single-step genomic evaluation of Eucalyptus nitens progeny test
SWP-T137	Developing the potential of New Zealand's small-scale sawmilling and alternative timber sector
SWP-FN128	Heartwood screening of selected cypress clones and hybrids