

EUCALYPTUS NITENS LAMINATED VENEER LUMBER
Heather McKenzie(1), Luis Gea*(2) and Doug Gaunt (3)

(1)Ensis genetics (formerly Forest Research); (2) Ensis genetics, (3) Ensis wood processing

*Autor para la correspondencia: Luis.Gea@ensisjv.com

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Summary

Eucalyptus nitens is a rapidly growing species which was little planted in New Zealand due to severe defoliation caused by a beetle, *Paropsis charybdis*. In 1987 *ensis* (formerly Forest Research) released a parasitic wasp, successfully controlling the pest. Since then, *E. nitens* has been planted in the Bay of Plenty/Taupo and Southland regions for local kraft pulp and export chip respectively. There may be a wider role for the species in New Zealand if it can be demonstrated that it can produce quality solidwood products. Ensis genetics and the Eucalypts Cooperative is collecting growth and wood quality information from most regions of the country and performance is being monitored in plantations. An *Ensis* sawing trial based on a 30-year-old stand showed there were some problems with sawn timber such as internal checking. The opportunity to extend the research to trees from another stand was provided by a unique stand of pruned fifteen-year old *E.nitens* in an *ensis* trial at Golden Downs Forest, Nelson. Whilst the butt logs were suitable for sawing, a structural product, laminated veneer lumber (LVL) was considered a likely appropriate use of the heavily branched second logs. This note summarises the main results of the LVL study.

Resumen

***Eucalyptus nitens* LVL (maderas a base de chapas laminadas)**

Eucalyptus nitens es una especie de rápido crecimiento pero debido a una defoliación severa causada por el insecto *Paropsis charybdis* el área de plantación en Nueva Zelandia era muy limitada. En 1987 *ensis* (anteriormente Forest Research) liberó una avispa parasítica que controló exitosamente ésta peste. Desde entonces, *E.nitens* ha sido plantado para la producción local de pulpa kraft y para el mercado exterior de astillas en las regiones de Bay of Plenty/Taupo y Southland. Un rol más importante para ésta especie es posible si se pueden demostrar las calidades de los productos maderables que puede producir. Ensis genetics y la Cooperativa de Eucalypts esta colectando información de crecimiento y calidad de madera de las principales regiones productoras y su rendimiento en plantaciones. Un ensayo de utilización de madera basado en un rodal de 30 años de edad demostró que existen problemas de utilización tales como rajaduras internas. Un nuevo rodal de *E. nitens* de 15 años de edad en Golden Down Forest- Nelson, nos dió la oportunidad de extender nuestra investigación a árboles en otro sitio. La troza principal fue utilizada para un estudio de madera aserrada mientras que la segunda troza con ramas muy grandes fue utilizada para producir LVL. Esta nota resume los principales resultados del estudio de LVL.

Veneer Production

Fifteen *E. nitens* trees were selected representing the range of wood density present in the stand. The trees were planted in 1983 and thinned at age 6 years to 100s/ha. The average diameter of the selected trees was 57 cm and height 36 m. Butt logs were used for a sawing trial. The 5.5 m second logs were transported to Mount Maunganui –North Island-, where they were measured for log size, branch-size and assessed for end-splitting. One log was too severely split to be peeled but the remaining 14 logs were cut into 2.6m long peeler bolts and peeled to produce 2.6mm thick veneer sheets. The veneer was dried to 18 % and full-sized sheets (1.2m x 2.4m) were graded based on structural plywood AS/NZS 2269:1994.

Large branches (8 to 13.5 cm diameter) led to most of the second log veneer sheets being lower than the accepted grades for structural plywood. There was evidence of stain and decay, associated with branches,

in two of the logs and a small amount of kino in one tree.

Manufacture of the LVL panels and testing

Stiffness of all the sheets was assessed using acoustical methods measuring sound velocity. The resulting distribution of stiffness values was split into approximately thirds and used to rank the sheets into low, medium and high stiffness classes. The sheets were re-dried to 7% mc prior to gluing with phenolic resin into 13 ply LVL panels (38mm thick).

LVL testing was in accordance with AS/NZS 4063:1992. Each LVL panel was ripped to produce twelve 90 x 38mm by 2.4m long studs which were tested for bending stiffness and strength, tensile strength and compression strength.

Test results and conclusions

A summary of the strength properties of the studs derived from bending strength tests for the three stiffness groups are shown in the table.

Table 1: Stud bending strength properties

Veneer Stiffness Group*	Average Stiffness of studs (GPa)	Strength of lower 5 percentile piece (MPa)
Low	12.7	61.6
Medium	14.0	62.3
High	16.6	103.4
No 1 framing radiata pine	8	17

*based on sound velocity.

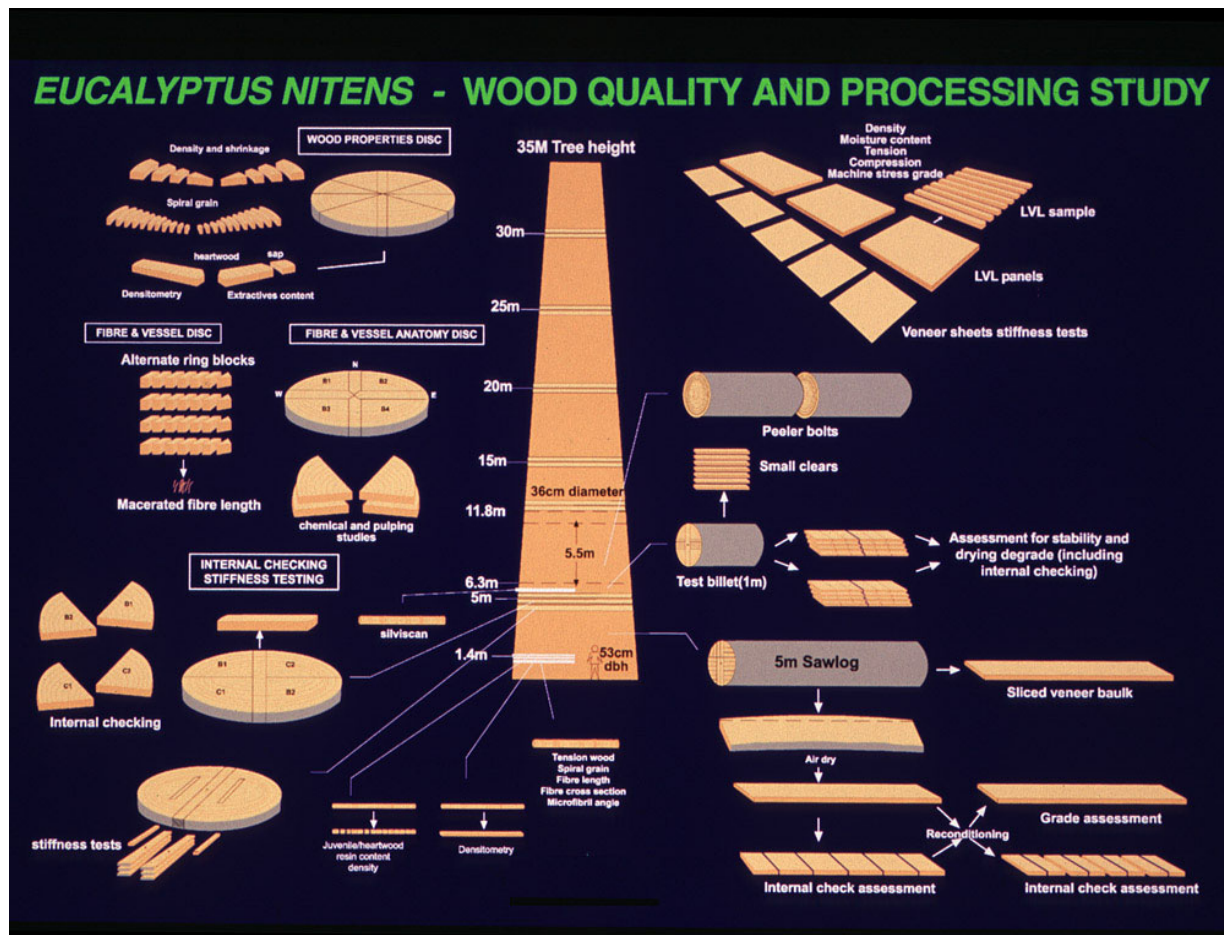


Figure 1: Wood quality and processing study

The study concluded that 15-year-old *Eucalyptus nitens* trees can produce second logs suitable for peeling veneer for LVL. Decay and kino were minor defects in the sampled logs but their prevalence in stands would need to be determined along with the occurrence of log end splitting due to growth stresses. The high stiffness of the LVL suggests that *E. nitens* veneer could be used in combination with lower stiffness radiata pine veneers for a net gain in LVL stiffness.

A number of results and analyses available from *ensis* but not reported here include:

- Growth stress assessed in the standing tree compared with log-end splitting and veneer splitting;
- Log volumes and recovery of veneers sheets;
- Veneer stiffness variation by log height and from pith to bark;
- Stiffness related to wood density.
- Comparison of veneer stiffness with stiffness calculated from small wood blocks cut from the same trees.
- Statistical analysis of LVL bending, tension and compression strengths tests
- Comparisons with characteristic grade stresses for the proposed New Zealand machine graded pine and existing framing grades.
- Comparison with New Zealand-grown radiata pine LVL.
- Conversion to Japanese Agricultural Standards (JAS) for structural LVL;

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Figure 2: *E. nitens* 15 yr old - flitch movement during sawing



Figure 3: *E. nitens* 15 years old prepared for sawing

References

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- SIS-24. 1993 - Japanese Agricultural Standard for Structural Laminated Veneer Lumbre.