



SPECIALTY WOOD PRODUCTS PROGRAMME UPDATE



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Summary

Highlights:

An updated Cypress Strategy has been produced. This is a 20-year plan to encourage investment in the Cypress industry.

Heartwood traits of *E. globoidea* trial are under genetic control and families with more and better heartwood have been identified.

Of the naturally durable eucalypts, *E. cladocalyx*, *E. macrorhyncha* and *E. globoidea* seem to be promising species that are resistant to EVB paropsine browse and maintain strong growth rates (DBH and height).

Remote sensing was trialled to classify species at a regional level and high classification accuracies for most species was achieved. Douglas-fir and eucalyptus were the two most accurately classified alternative species, with over 90% of accuracy.

RESEARCH PROGRESS: Q2 Year 7

Naturally durable eucalypts

The third (JNL Ngaumu) of three *E. globoidea* breeding trials has been phenotyped for heartwood properties. The results were comparable to the assessment of the previous *E. globoidea* trials. Photo below shows the cores with heartwood dyed pink.



The work has shown that heartwood traits in this *E. globoidea* trial were under genetic control and families with more and better heartwood have been identified.

Cypresses

An updated Cypress Strategy document was produced. New Zealand Cypress Strategy 2022 – 2042, Whakamahere Cypress Encouraging Investment in the Cypress Industry. This strategy presents the business case for developing a cypress forest industry, in particular the required market development for cypress timber and growing a plantation industry that is of a sufficient scale to support further development and growth.

Market barriers currently limit applications for the timber and growers lack confidence in planting the species because of its reputation for being prone to disease.

For confidence to plant the right (canker resistant) cypress species in the right place to produce profitable returns, land owners must be adequately informed. Comprehensive, detailed information (including productivity models, economic models etc) and regularly updated general information (Cypress Growers handbook) is essential to inform stakeholders decisions.

Regional cypress industries are viable in all regions throughout New Zealand. Matching species and cultivars to regions and sites is essential. Matching demand with supply should take place at the regional level and involve co-operative supply chains.

Photo below is of a 22-year-old *Macrocarpa* at Taihape.

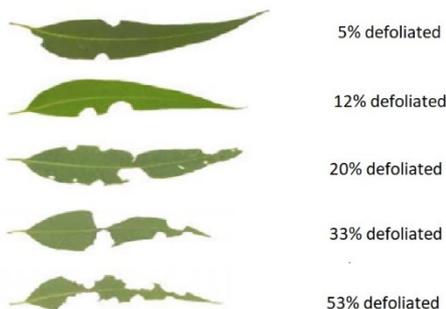


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Pest management

Tolerance and resistance of *Eucalyptus* to insect defoliation by EVB (*Paropsisterna cloelia*) was examined. Seven Eucalypts species were assessed in 4 trials. The image below shows the severity of damage index used.



Key results were:

1. At the species level: *E. cladocalyx*, *E. macrorhyncha* and *E. globoidea* were the most resilient to defoliation, whereas *E. quadrangulata* and *E. tricarpa* were the least resilient.
2. *E. globoidea*, *E. cladocalyx* and *E. macrorhyncha* seem to be promising species that are resistant to paropsine browse and maintain strong growth rates (DBH and height). Moreover, some individual *E. globoidea* trees seem to be more resistant and/or tolerant. *E. bosistoana* families expressed variable resistance to paropsine defoliation.

Regional business cases

A report was produced that covers an analysis of making a range of engineered and modified wood products from non-durable eucalypts (*E. nitens* and *E. fastigata*), thermally modified cypress and Douglas-fir. The techno-economic analysis of these options was done using the Scion WoodScape model with new products added and updated log prices as required.

The highest ROCE (return on capital employed), at 29.6%, was from the thermally modified Cypress. Other financially viable options included peeled Eucalyptus veneers (24%) and OSB (17.7%). It should be noted that these Eucalypt based operations take very different log grades as feedstocks and could be complimentary to each other in terms of utilising a tree crop.

The area of forest required to grow sufficient biomass to service the processing plants assessed was predicted and ranged from ~2,000 Ha to ~13,000 Ha. The area of forest needed depended on processing plant being considered (or cluster) and target ROCE. The full list of products was:

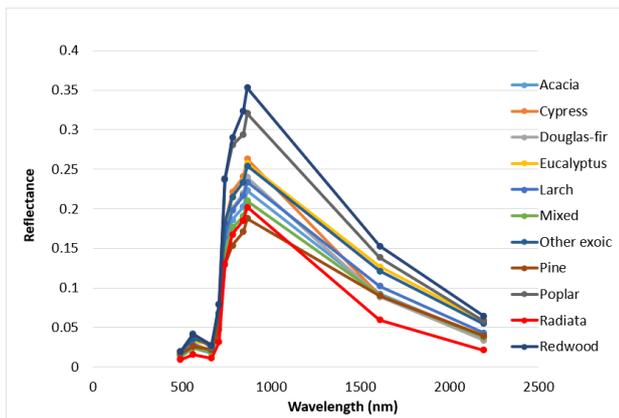
- Non-durable eucalypt peeled veneer
- Non-durable eucalypt sliced veneer
- Non-durable eucalypt CLT
- Non-durable eucalypt glulam beams
- Non-durable eucalypt OSB
- Non-durable eucalypt LVL
- Thermally modified cypress
- Douglas-fir CLT
- Douglas-fir LVL
- Douglas-fir glulam

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A study demonstrated proof of concept of using remote sensing to classify species of small-scale plantation at a regional level and achieved high classification accuracies for most species. Douglas-fir and eucalyptus were the two most accurately classified alternative species, with over 90% of producer's accuracy. The most important input variable selected for the classification was DEM (Digital Elevation Model), suggesting that elevation plays an important role in differentiating plantation species. The accuracy of species classification highly depends on the availability of truthing data. The figure below displays the spectral images of each of the different species/species groups that were examined.



The transferability of classification derived from one region to another region is low due to regional variations in the topography, climate and species composition. In order to map the national cover of alternative species, truthing data that cover a range of species and ages classes from all regions are required. One limitation with the study is that pre-defining the geographic boundaries of alternative species is required to define the extent of classification, as the current small-scale plantation map developed by the School of Forestry may not pick up all the alternative species. Without the pre-defined boundaries, the classification approach tends to map other land covers as alternative species plantations due to a similar spectral signature.

Reports and other outputs completed

Report No.	Document Title
SWP-T138	New Zealand Cypress Strategy 2021 – 2041
SWP-T140	Eucalyptus resistance to paropsine beetles
SWP-T141	Techno-economic analysis of producing engineered and thermally modified products from specialty wood species
SWP-T142	Assessment of Eucalyptus globoidea heartwood at Ngaumu
SWP-T143	National forest owner survey and resource inventory of alternative species. Stage 2b: Mapping alternative species using remote sensing