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UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

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SFF Project: Minimising growth-strain in eucalypts to transform processing

Dear all,

There has not been a great deal to report over the last few months, as we were waiting for the trees to grow. However, things are now starting to happen. Here is a first update on the wood properties of *E. bosistoana*.

1) Woodville

The plantings at Woodville ~10.000 trees (170 families of *E. bosistoana* and 31 families of *E. argophloia*) were growing well over the last months. During the 2nd half of 2016 the trials were maintained by staking, pruning and weeding to ensure good survival and stems of suitable form for testing. In November/December 2016 the February 2015 *E. bosistoana* plantings (4032 trees from 81 families) were harvested and assessed for growth, form, growth-strain and other wood properties. The trial yielded 2569+ useful stems. We are currently analysing the data in more depth to select the trees for propagation. Table 1 shows preliminary results. The data illustrates that the traits were variable and that this variation was partly under genetic control. Although heritability of growth-strain was not particularly high the large variation suggested that growth-strain can be selected for. The large within-family variability in growth-strain can be seen from Figure 1. It is also of interest to note that these 22-month old trees had an average dynamic MoE of >11 GPa. This compares to 2-3 GPa for radiata pine at this age. Noteworthy is also the high heritability of stiffness.

Table 1: Characteristics of *E. bosistoana* at age 22-month

Trait	Mean	Coefficient of Variation (%)	Approx. heritability
Strain	2072 µ strain	36.4	0.20
Air-dry density	816 kg m^{-3}	5.8	0.52
Stiffness	11.2 GPa	17.2	0.81
Volumetric shrinkage	21 %	18.8	0.28
Diameter	35.7 mm	23.9	0.30
Height	2.52 m	19.4	0.51

Strain was not correlated to growth as can be seen from Figure 2, allowing the selection of large low-growth strain individuals.

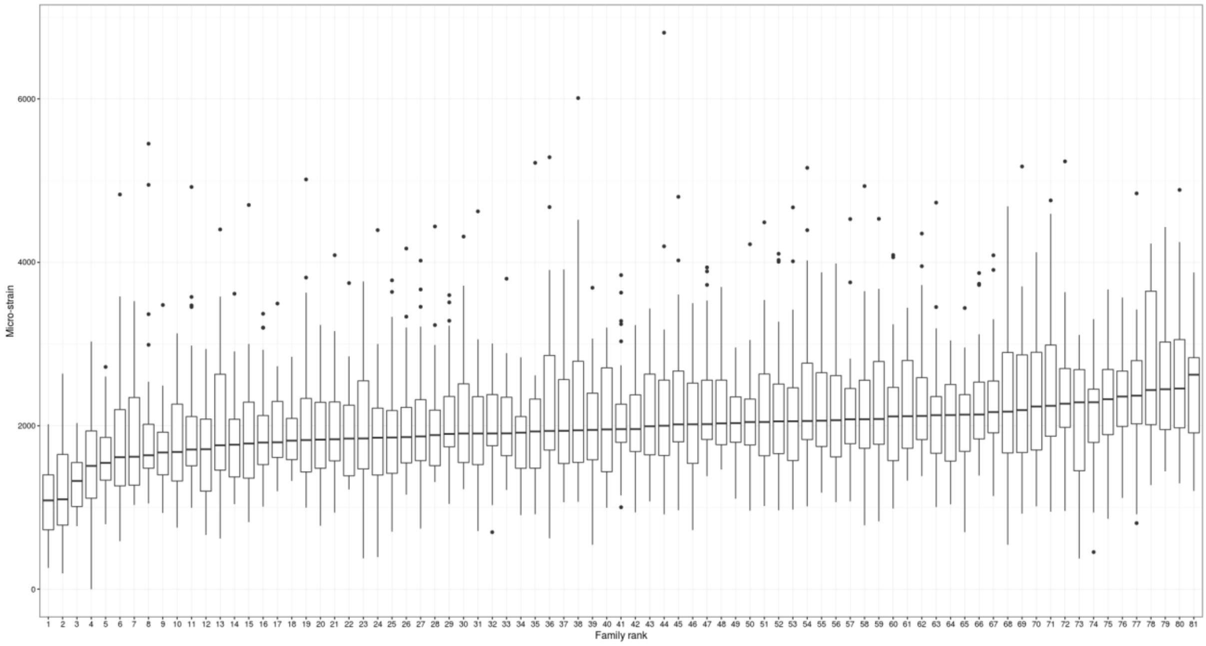

Figure 1: 81 *E. bosistoana* families ranked for growth-strain at age 22-months

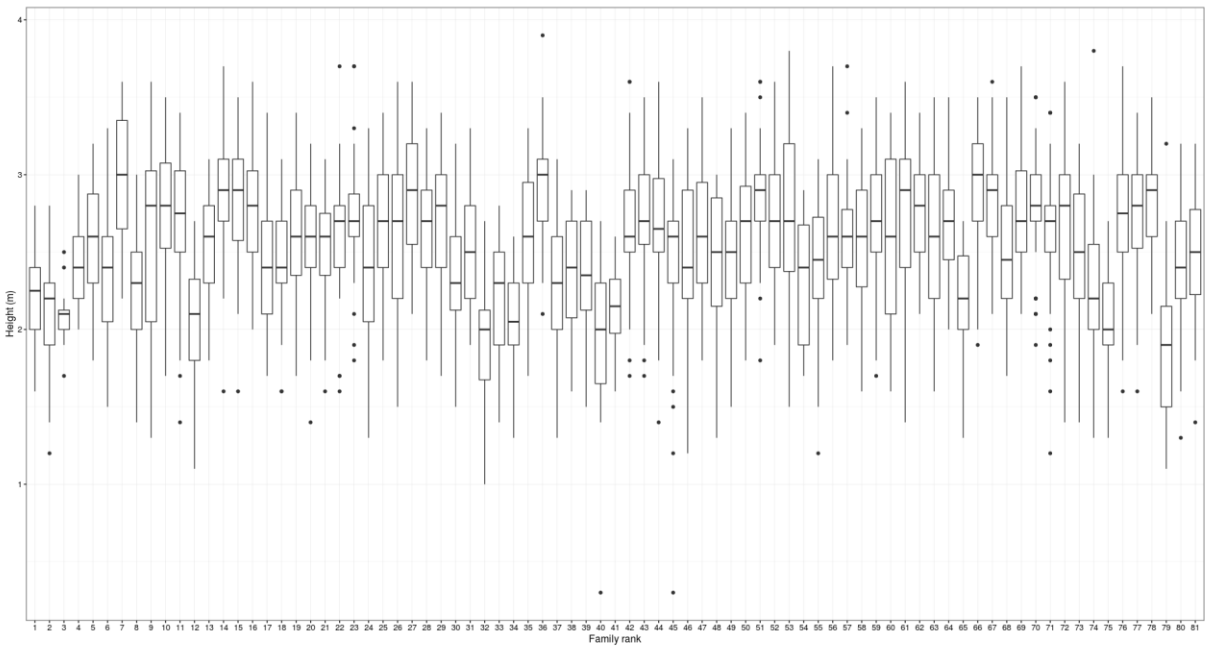

Figure 2: Tree height for 81 *E. bosistoana* families ranked for growth-strain at age 22-months

2) Propagation

Coppice is developing on the stumps at Woodville. Size of the coppice is variable (Figure 3) but is thought to be large enough for propagation by the end of February. Last year's propagation trials have indicated that setting cuttings before March is desirable as survival decreased thereafter. So time is of essence, but as a backup, it should be possible to recollect material from the stumps next season if no cuttings of a selected individual survive.

Figure 3: Coppice on *E. bosistoana* stumps harvested November/December 2016 in Woodville. Photo taken on the 18th of January

3) Workshop

We are organising a workshop 'DURABLE EUCALYPTS ON DRYLANDS: PROTECTING AND ENHANCING VALUE' for 19th/20th April 2017 at the Marlborough Research Centre in Blenheim. On the 19th we will present the recent progress made in the NZDFI programme and also hear from international experts about research in this area. The 20th is earmarked for a fieldtrip to see the trees and potential products made from them. See attached notice.

4) Peeling / LVL

Another part of the programme was a demonstration trial to explore durable eucalypts for veneer peeling/LVL led by Nelson Pine Industries Ltd. No large enough *E. bosistoana* logs were available in NZ for peeling. Therefore 30-year old *E. globoidea* was used. Some logs peeled easily yielding good veneer. The peeling quality was more associated with growth-strain rather than acoustic velocity of the logs, strengthening the argument to select for low growth-strain.

The average dynamic MoE of the *E. globoidea* veneers (14.7 GPa) turned out to be not exceptionally high. However, the best log of this unimproved resource yielded veneers 26% stiffer than the average. It should be noted that *E. bosistoana* can be expected to produce stiffer wood (Table 1). LVL was produced from these veneers and subjected to bonding and bending tests. The results highlighted the challenge of achieving quality glue lines between the *E. globoidea* veneers. In particular high density seemed to reduce bond quality. More work on gluing is required. More detail can be found in the attached reports.

I hope to see you at our conference in April. The research is producing interesting results and points to exciting opportunities. Thank your for your support,

Clemens Altaner