Presentation Title

Breeding - the quiet achiever with a big impact on profitability

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Abstract (no longer than 250 words)

Tasmanian blue gum (*E. globulus*) and shining gum (*E. nitens*) are Australia's two main, commercial hardwood forest tree species. Innovative breeding programs have underpinned their commercial success. Tree Breeding Australia (TBA) has strategically introduced cutting edge technologies into these industry programs in recent decades.

The breeder's equation states that genetic improvement is a function of the available genetic diversity, the scale of the program (how big is the population and number of progeny tested and selected), how accurate the breeder is able to estimate the value of the genes a parent tree carries, in terms of their effects on a progeny's performance, and the length of the generation interval. All innovation stems from the desire to manipulate the components of the breeder's equation to achieve greater genetic gain. This presentation will focus on how value due to innovation is determined; and summarise each innovation the TBA has overseen.

One example is the more recent attempt to incorporate genomic information into the prediction of genetic values for all individuals in the breeding program, and how genomic information is providing the catalyst for a major change in the breeding strategy, which will substantially reduce the generation interval. Other examples include the introduction of complex numerical techniques that are able to balance genetic gain with genetic diversity, and the definition of breeding objectives that better connect the trees' genetics with forest productivity and valuations. The former is important for ensuring the long-term fitness of our commercial tree populations, while the latter is important for ensuring investments into plantation forestry are underpinned by reliable predictions of future productivity.