

PRESS RELEASE

Subject: Economic and genetic gain continue to improve over time for *E. globulus*

Date: 7 July 2016

The Southern Tree Breeding Association Inc. (STBA) has recently completed a new genetic analysis (run) for the national *Eucalyptus globulus* tree improvement program using TREEPLAN. Each run builds on previous analyses by including recently acquired performance data gathered from genetic trials across Australia. This improves our knowledge of the genetic potential of all trees for use in breeding and deployment.

STBA provides genetic values for each tree on clearfall characteristics such as growth (harvest volume) and wood properties (density and kraft pulp yield). Economic indices (based on various production environments, processing systems and end uses) are calculated to quantify the net present value of each tree against other trees. Growers can then compare the genetic and economic worth of seedlots and trees depending upon their production and processing objective.

For example:

The value of gain in: **Volume (m³/ha)** plus **Density (kg/m³)** plus **Kraft Pulp Yield (%)** equals **\$NPV**
marginal gain in net present value by using seed from this tree relative to base line material

The integrated approach provides efficiencies as the national databases allow TREEPLAN to use all historical and new information in a single industry wide multivariate genetic analysis. Growers can compare genetic potential on an “apples vs apples” basis to optimise selection of material for plantation establishment.

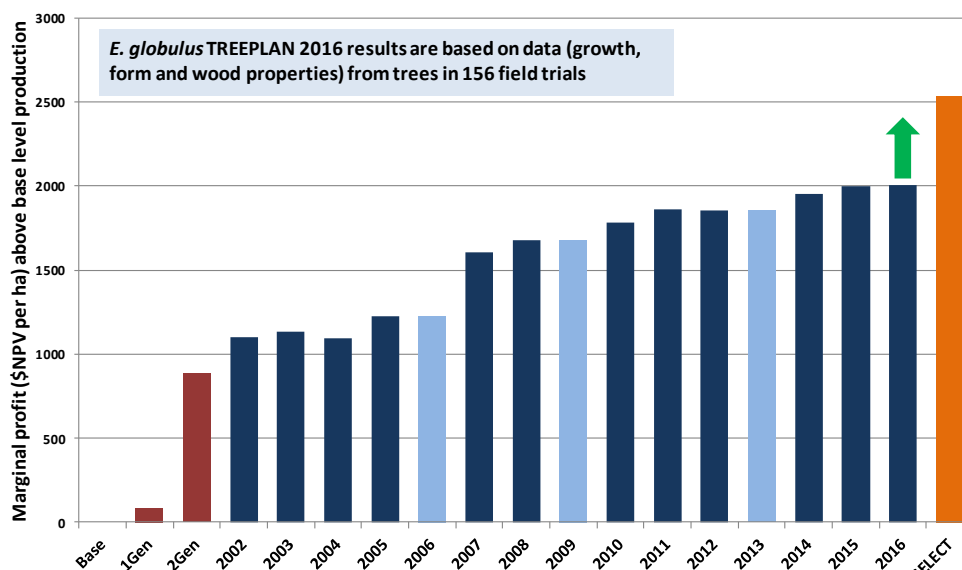
TREEPLAN statistics for this run	Trials	Trees	Measured Traits
Total number included:	156	298,191	18
Number of objective traits: 3 (volume growth on a regional basis, density and kraft pulp yield)			
	Trials	Trees	Measurements
Size of <i>E. globulus</i> database:	187	477,851	7.6 million
Total DATAPLAN database size	2177	5 million genotypes	99 million

The Southern Tree Breeding Association (established in 1983) is the national body which manages the Australian tree improvement programs for Blue gum (*E. globulus*) and Radiata pine (*P. radiata*). STBA is a not for profit cooperative and its members collectively contribute resources to maximise the genetic quality and value of the plantation resource.

TREEPLAN software has been jointly developed for use in the forest industry by STBA, AGBU (a joint institute of the University of New England and Industry and Investment NSW) and PlantPlan Genetics.

Economic gain increases steadily over time

Improvement in marginal profit (\$NPV) per ha across generations and over time for the best 1% of genotypes (trees) based on the national economic objective for breeding



This graph shows the average marginal improvement in net present value \$ of the best 1% of genotypes identified with each annual analysis. For comparative purposes, each group of genotypes identified previously is now described in terms of its updated NPV value in the 2016 TREEPLAN analysis. This allows for an objective comparison of genetic improvement over time. The SELECT result is indicative of the gain which could be achieved in a new orchard based on an average Australian index.

The results indicate a high and competitive return (17-28%) on investment through membership fees can be achieved.

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The table below shows the average performance of each generation for each trait as well as the average trait values of the best 1% of trees selected for a single trait. For example, the best 1% of trees for Volume alone would have an average predicted increase in volume production of 55 m³/ha (25% more than base productivity) but only delivers a marginal improvement in economic value (profit) of \$1093 due to trade offs in other traits. The SELECT orchard result is indicative of the gain which could be achieved in a new orchard based on an average Australian index.

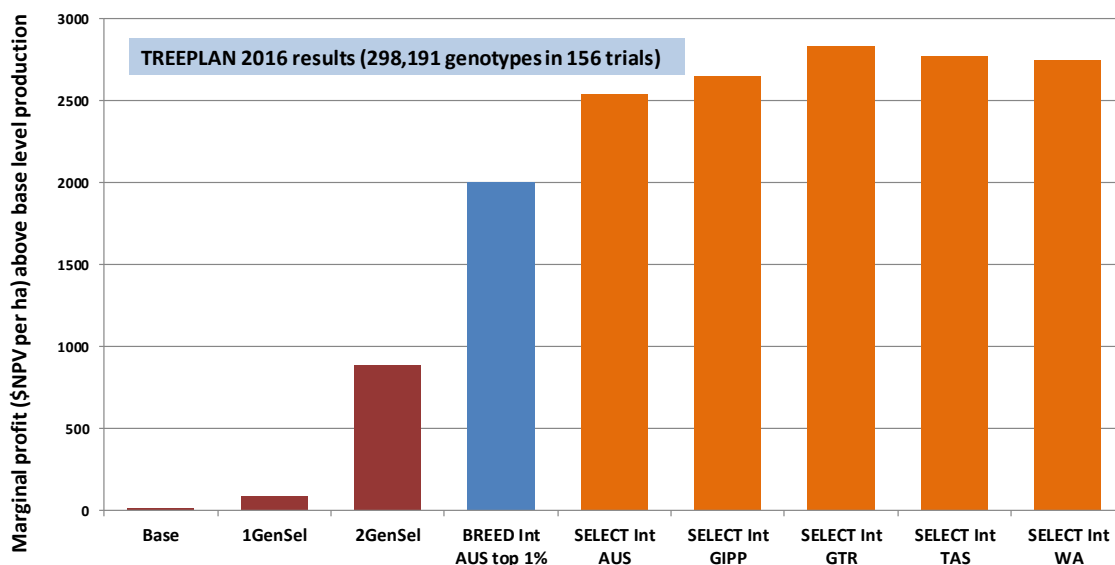
Marginal gain (or losses) in selecting various groups of genotypes based on generation, the national index or single traits.

	\$Index	Volume		Density		Kraft Pulp Yield	
<i>Base Productivity</i>	NVP \$/ha	229 m ³ /ha		537 kg/m ³		55.7%	
Baseline* Genotypes	0	0	-	0	-	0	-
First-Generation	84	3.00	1%	0.84	0%	-0.13	-0%
Second-Generation	887	24.23	11%	8.90	2%	-0.59	-1%
Top 1% for Index	2005	36.03	16%	24.86	5%	0.03	0%
Top 1% for Volume	1093	55.42	25%	-13.23	-2%	-0.69	-1%
Top 1% for Density	763	-15.32	-7%	39.81	7%	-0.35	-1%
Top 1% for Kraft Pulp Yield	-727	-55.59	-25%	10.70	2%	2.13	4%
SELECT Orchard	2536	39.97	18%	38.83	7%	-0.20	0%

* Baseline consists of 616 native stand trees used in 1987 and 1988 CSIRO seed collections

Deployment gains are more targeted

The following graph is indicative of the additional marginal improvement in NPV\$ available when deploying STBA genetic material. National and regional orchards (SELECT – orange) are compared with the average NPV\$ of the generations and the best 1% of genotypes identified for breeding purposes (BREED - blue). The breeding program must retain diversity and targets national objectives, whereas seed producers and forest growers can increase selection intensity and focus more on regional performance. For example, despite the national breeding program delivering a marginal improvement of NPV\$2005, a new orchard for the Green Triangle Region (SELECT Int. GTR) could deliver a marginal gain of NPV\$2829. The marginal gains are shown using an 7% discount rate.



For more information see the STBA web site (www.stba.com.au) or contact the General Manager, Dr Tony McRae (tmcrae@stba.com.au) or Business Manager, Peter Cunningham (pcunningham@stba.com.au).