

## PRESS RELEASE

**Subject: Economic and genetic gain continue to improve over time for *P. radiata***

**Date: 26 May 2015**

The Southern Tree Breeding Association Inc. (STBA) has recently completed a new genetic analysis (run) for the national *Pinus radiata* tree improvement program using TREEPLAN. Each run builds on previous analyses by including new measurement data gathered from new and existing trees in genetic trials across Australia. This evaluation allows us to identify new selections and improve the accuracy of prediction for use in breeding and deployment.

Genetic values for clearfall harvest age characteristics of growth (MAI), form (SWEEP and BRANCH size) and wood properties (STIFFNESS) are produced for each tree. Economic indices (based on various production systems and end use processing) are used to quantify the net present value of each tree against all other trees. Growers can then compare the genetic and economic worth of trees (and seedlots) depending upon their particular production and processing objectives.

### For example:

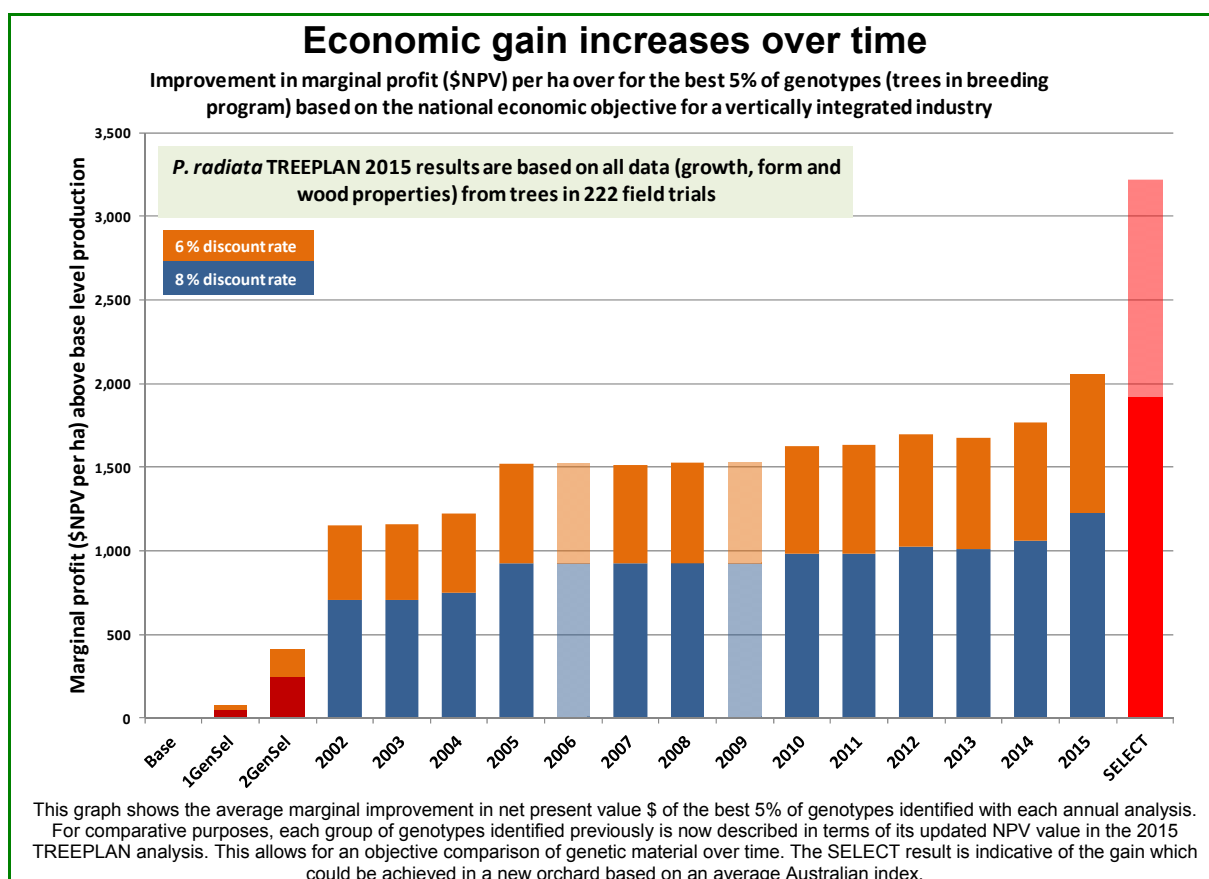
The value of gain in:	<b>MAI</b> growth (MAI m <sup>3</sup> /ha/yr)	plus	<b>STIFFNESS</b> (GPa)	plus
	reduced <b>BRANCH</b> size (cm)	plus	reduced <b>SWEEP</b> (mm/m)	<b>equals</b>
<b>\$NPV</b>	marginal increase in net present value by using seed from this tree relative to base line trees			

The integrated approach provides efficiencies as the national database allows 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:	222	443,641	33
Number of objective traits: 4 (with MAI on a regional basis, BRANCH size, STIFFNESS and SWEEP)			
	Trials	Trees	Measurements
Size of <i>P. radiata</i> database:	424	836,671	14.3 million
Total DATAPLAN database size	2116	4.7 m genotypes	90 million

The Southern Tree Breeding Association (established in 1983) is the national body which manages the Australian tree improvement programs for Radiata pine (*P. radiata*) and Blue gum (*E. globulus*). STBA is a not for profit cooperative and our 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.



## PRESS RELEASE *continued*

### Subject: Economic and genetic gain continue to improve over time for *P. radiata*

The table below shows the average performance of each generation for each trait as well as the average trait values of the best 5% of trees (22,182 trees) selected for a single trait. For example, the best 5% of trees for MAI (volume) alone would have an average predicted increase in volume production of 3.64 m<sup>3</sup>/ha/yr (16% more than base productivity) but only deliver a marginal improvement in economic value (profit) of \$969 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 loss) in selecting various groups of genotypes based on generation, the national multi-trait index or independent traits.**

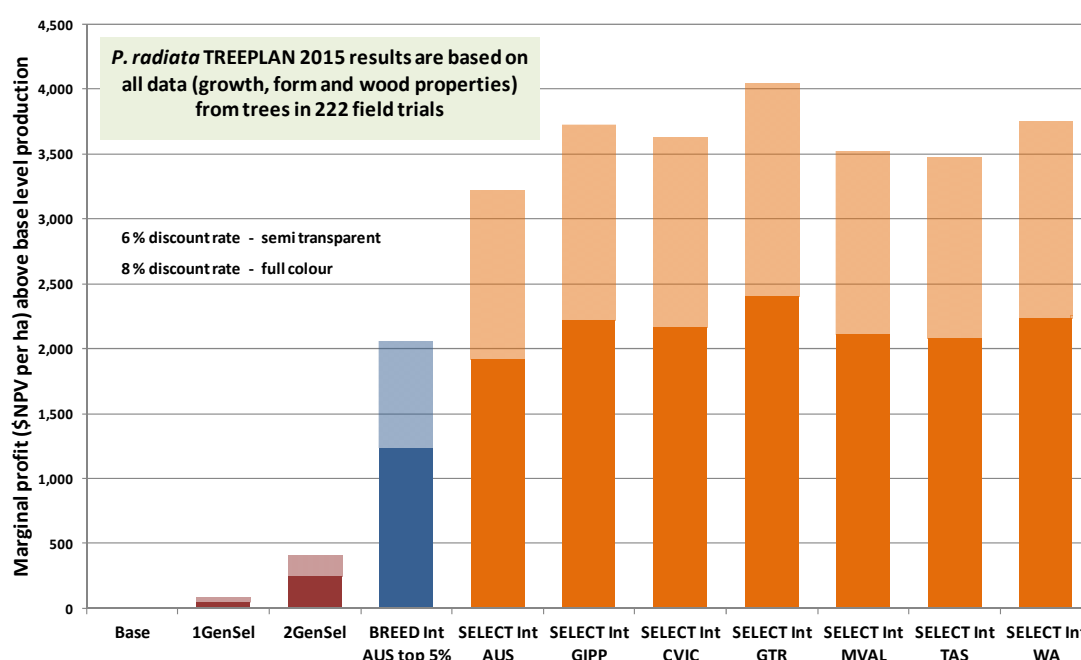
	INDEX	MAI (volume)	STIFFNESS		BRANCH SIZE		SWEEP		
Base productivity* and units	NPV \$/ha	22.6 m <sup>3</sup> /ha/yr	11.3 GPa		5.5 cm (lower is better)		10.5 mm/m (lower is better)		
Baseline genotypes	0	0	-	0	-	0	-	0	-
Overall mean (443,641 trees)	179	0.92	4%	-0.16	-1%	0.12	2%	-0.13	-1%
1G Selections (1137 trees) <sup>^</sup>	80	0.99	4%	-0.28	-3%	0.11	2%	-0.09	-1%
2G Selections (855 trees) <sup>^</sup>	406	1.19	5%	-0.20	-2%	0.02	0%	-0.62	-6%
Top 5% for NPV\$	2058	1.99	9%	0.84	7%	-0.43	-8%	-0.76	-7%
Top 5% for MAI	969	3.64	16%	-0.74	-7%	0.01	0%	-0.94	-9%
Top 5% for STIFFNESS	1426	0.06	0%	1.42	13%	-0.09	-2%	0.25	2%
Top 5% for BRANCH	1152	1.31	6%	-0.10	-1%	-0.79	-14%	-1.11	-11%
Top 5% for SWEEP	732	1.86	8%	-0.68	-6%	-0.31	-6%	-2.21	-21%
<b>SELECT Orchard</b>	<b>3217</b>	<b>2.21</b>	<b>10%</b>	<b>1.62</b>	<b>14%</b>	<b>-0.70</b>	<b>-13%</b>	<b>-1.47</b>	<b>-14%</b>

\* Base Productivity is an average commercial performance indicator used in developing TREEPLAN Genetic Values for *Pinus radiata*.

<sup>^</sup> 1G and 2G trees selected using breeding values reported in STBA TR92-02 and TR92-04.

### 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 5% 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\$1231 at an 8% discount rate, a new orchard for the Green Triangle Region (SELECT Int. GTR) could deliver a marginal gain of NPV\$2406. The marginal gains are shown for discount rates of 6 and 8%.



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