

EARLY SELECTION EFFICIENCY FOR GROWTH IN TWO HALF-SIB POPULATION OF *Eucalyptus grandis* Hill ex. Maiden

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INTRODUCTION

Reducing the time in each cycle of a breeding program is one strategy to increase genetic gains. The objective of the study was to estimate the efficiency of early selection in *Eucalyptus grandis* Hill ex Maiden half-sib families selected prior to year 5 based on diameter at breast height (DBH), total height (HGT) and cylindrical volume (V) in a solid wood genetic improvement program.

METHODS

Progeny trials, grouped in two populations according to the seed source, P1, three test, 69 families and P2, two test, 137 families), were planted in 2009 (1250 trees/ha) in the northeast of Uruguay, with randomized complete block design (RCB) and single tree plot (STP).

Heritability, age-age correlation, trait-trait correlation, genetics gains (G) was calculated. With all this information was applied the efficiency of early selection equation describe by Lambeth, 1980.

Ages measured		
DBH (cm)	HGT (m)	VOL (m ³)
**	1	**
2	2	2
3	3	3
4	4	4
5	5	5



How much gain per generation can be sacrificed in the interest of saving time? (Lambeth, 1980)

RESULTS

Mean heritability increased as they approached year 5, DBH 0.21 to 0.36, HGT 0.42 to 0.54 and VOL 0.20 to 0.36. Age-age correlations were high from year 3 (>0.80 averaged across tests and >0.70 for each test). DBH was the variable that presented the highest genetic correlation with VOL from year 3 (>0.70 averaged across tests and >0.60 for each test).

$$E = \frac{h_x r_{P(XZ)} T_Z}{h_z T_x}$$

E = efficiency of early selection, $h_{x,z}$ = square root of the heritability, $r_{P(XZ)}$ = phenotypic correlation juvenile and mature measurements of a trait, $T(XZ)$ = number of years to complete a breeding cycle ($T_z=5+2$ years; $T_x=2..4+2$).

Efficiency by test – E > 1

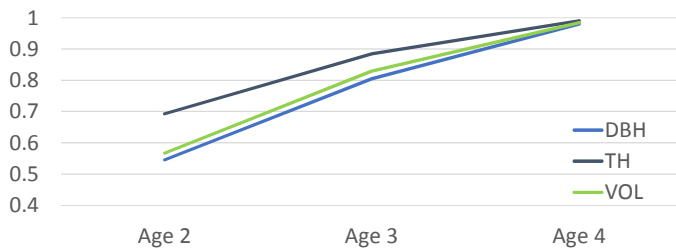
Traits	Age	CL104	TB102	TB103	CL113	TB112
DBH	2	0.44	1.31	0.84	0.65	0.35
	3	0.92	1.18	0.93	1.08	0.94
	4	1.14	1.09	0.94	1.12	0.82
HGT	2	0.98	1.28	0.79	1.19	1.12
	3	1.62	1.03	1.19	1.14	1.33
	4	1.28	0.99	1.02	1.16	0.90
VOL	2	0.36	1.23	0.69	0.66	0.36
	3	0.87	1.12	0.83	0.99	0.90
	4	1.04	1.05	0.94	1.11	0.84

The selection efficiency (E) was higher in years 3 and 4. The genetic parameters and the E for DBH, HGT and VOL showed similar behaviors within each trial and variations between trials.

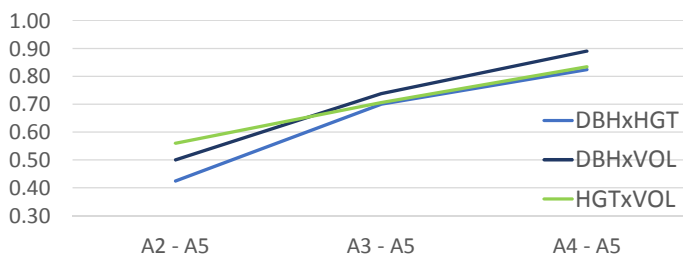
CONCLUSIONS

Results indicated that selecting between ages 3 and 4 years is more efficient than selecting at age 5 years. Shortening the cycle time will increase the gain per unit of time even though the gain per cycle is lower. Moreover, DBH can be used for indirect selection on volume due to their positive correlation. These tools can be used for different strategies in the breeding program.

Age-Age Genotypic correlation



Trait-trait Correlation



Heritability by age

