

GENETIC VARIABILITY OF *EUCALYPTUS UROPHYLLA* FOR ROOTING CHARACTERS

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INTRODUCTION

To attempt the crescent demand for wood and its derivatives, the eucalypt silviculture reaches high level of technological development (MORA and GARCIA, 2000; ABRAF, 2008). The genetic improvement have shown to be very efficient to give high magnitude of gains in wood productivity, pest and disease tolerances, propagation method, and rooting ability of cuttings. For clonal commercial stands high rates of rooting in nurseries is desirable.

Thus, the increment of rooting rate is an important issue to consider on eucalypt clonal plantings. The character is compounded by genetic and environmental components being important to know its inheritance and other genetic parameters. The genetic variability within species is also another component to be considered on the rooting ability of cuttings and on the clonal seedling quality (COSTA *et al.*, 2002; GOMES *et al.*, 2000). Because of that, the selection of rooting ability is favorable to obtain genetic progress and increase of clonal seedling production on eucalypt nurseries.

The knowledge on the estimates of genetic variability can give subsidy to get decision during the plan and development of breeding programs. The genetic components allow

to choose the best genetic material and consequently to increase the genetic gains on rooting of clonal seedlings.

The objective of the study was to estimate the quantitative genetic parameters of open pollinated progenies of *Eucalyptus urophylla* for rooting ability of cuttings for commercial stands.

MATERIAL AND METHODS

The experiment was set up in greenhouse of Department of Plant Breeding and Crop Science (DPMV), School of Agricultural Sciences (FCA) of São Paulo State University (UNESP) – Botucatu, São Paulo State, Brazil. The clonal progeny trial was set up, with 20 progenies of *Eucalyptus urophylla*, by design of randomized blocks, with three replications, five cuttings of each progeny for linear plots, totalizing 300 plants through the clonal garden. The rooting progeny trial was set up in three replications from sprouts of progeny trial.

RESULTS AND CONCLUSION

The results showed there are high environment effects on rooting ability characters, and the selection can be effective when progenies are selected.

The averages of root length was 83.46 cm, the superficial area of roots was 9172 cm³, the projected area of roots was 3.44 cm², the root volume was 0.079 cm.m⁻³, the root diameter was 0.036 cm, and the dry matter was 0.011 g. The experimental coefficients of variation were high for all analyzed characters; for average of the root diameter was 65%, the total length of roots was 61%, and the lowest coefficient was 40% for root volume. The values of experimental coefficients of variation are considered high,

indicating high data variation (SAMPAIO, RESENDE and ARAÚJO, 2002; SENNA and SEBBENN, 2010).

The heritability coefficients in level of progeny averages (h^2_{mp}) varied from 0.11 for superficial area of roots to 0.57 for total length of roots, showing that total length of roots is the appropriated character to select the best progenies.

There are genetic variability for studied characters of rooting and the total length of roots, and in practice, is the best genetic control (high coefficients of heritability), that will give the best genetic gains on selection procedures. Therefore, dry matter is the easier character to analyze and it presented high genetic variability and high heritability coefficient. This fact should be considered to facilitate the evaluations (MORI, 1993).

Table 1. Character averages, coefficient of experimental variation ($CV_{exp}\%$), and F test for different characters of *Eucalyptus urophylla* progenies

CHARACTER	Average	$CV_{exp}(\%)$	F
Total Root Length	83.46	61.21	1.80
Total Superficial Root Area	9.17	37.89	1.20
Total Projected Root Area	3.44	61.34	1.20
Total Root Volume	0.08	40.25	0.69
Average of Root Diameter	0.04	65.14	0.52
Dry Matter of Root	0.01	51.81	2.01

Table 2. Estimates of plant heritability coefficients, narrow sense (h^2_a), of progeny average (h^2_{mp}), and additive within progenies (h^2_{ad}); coefficient of genetic variation in plant level (CV_{gi}), coefficient of variation among progenies (CV_{gp}), coefficient of variation of error (CV_e), and accuracy (AC_{prog}) for different characters of *Eucalyptus urophylla* progenies.

CHARACTER	h^2_{ad}	h^2_{mp}	h^2_a	$CV_{gi}(\%)$	$CV_{gp}(\%)$	$CV_e(\%)$	C^2_{parc}	AC_{prog}
Total of Root Length	0.60	0.57	0.34	82.23	41.11	61.21	0.08	0.76
Total of Superficial Root Area	0.05	0.11	0.11	15.42	7.71	37.88	0.10	0.33
Total of Projected Root Area	0.53	0.55	0.32	78.00	39.00	61.34	0.09	0.74
Total of Root Volume	0.07	0.15	0.13	19.42	9.71	40.24	0.10	0.38
Average of Root Diameter	0.59	0.57	0.34	86.97	43.48	65.14	0.08	0.76
Root Dry Matter	0.39	0.46	0.28	55.85	27.93	51.81	0.09	0.68

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