VARIAÇÃO DA DENSIDADE BÁSICA DA MADEIRA DE PROGÊNIES DE *Eucalyptus urophylla* EM DOIS LOCAIS

VARIATION ON WOOD BASIC DENSITY OF *Eucalyptus urophylla* S.T. BLAKE PROGENIES AT TWO SITES

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R E S U M O

Estudou-se neste trabalho a variação da densidade básica da madeira entre procedências e progênies de eucalipto plantados em duas localidades. As progênies de ***Eucalyptus urophylla*** originárias da ilha de Timor na Indonésia foram plantadas em Belo Oriente (MG) e Linhares (ES) no delineamento de blocos compactos em famílias (compact family blocks) com 3 repetições no espaçamento de 3,0 x 2,0m. Após 4 anos as árvores foram amostradas ao nível do DAP com a sonda Pressler e sua densidade básica determinada pelo método do máximo teor de umidade. Os resultados mostraram que as progênies tiveram comportamento similar nos dois locais. A maior variação entre progênies ocorreu naquelas provenientes da região Oebaha II. Os valores médios de densidade básica* das progênies não foram diferentes das procedências brasileiras utilizadas como testemunhas no experimento.

Palavras-chave: recursos genéticos, densidade básica, progênies, ***E. urophylla***.

SUMMARY

The appropriate knowledge about genetic resources potential is essential for the forest patrimony conservation and protection. It is

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important to emphasize the studies on variation in wood basic density conducted in trials of progenies and provenances. Progenies of ***Eucalyptus urophylla*** from Timor Island - Indonesia were planted in Belo Oriente (Minas Gerais State) and Linhares (Espírito Santo State) in the southern region of Brazil. The experimented design in three replications was a compact family block with an unequal sub class number at 3.0 x 2.0m spacings. Four years latter the trees were sampled with increment borer for wood basic density determination at dbh by maximum moisture content method. The results showed that the progenies had a similar behavior at two planting sites. The greater variation among the progenies occurresd in Oebaha II region. The progenies density mean values were not different from Brazilian provenances used as control in the experiment.

Key words: genetic resources, basic density, progenies, ***E. urophylla.***

INTRODUCTION

In Brazil, the management of ***Eucalyptus urophylla*** S.T. Blake heritage has been limited by the restrict genetic base of the existing populations, by the uncontrolled hybridizations and genetic depressions caused by the intense commercializacion of seeds from hybrid plantations (Mora & Ferreira, 1978). Recent introductions mainly from Flores Island have been performed in order to establish production programs of improved seeds.

This species occurs naturally in serveral islands of Indonesia. In Timor Island it appears at altitudes between 80 and 2700m and in Flores Island, at altitudes between 400 and 1350m. Because of the different climatic conditions of the origin region, it is desirable to experiment other origins like Timor, aiming at choosing the best seeds sources.

Geographic variation in volume, growth rate and wood properties within the natural range has been reported. Variation in wood specific gravity of species, provenances and progenies across sites is a critical factor in determining the most suitable seed sources for plantations establishment (BARRET *et al.*1975, PINTO 1984,

BRASIL *et al.*1986, MORAES 1987, MORI *et al.* 1990).

The aim of this paper is to study wood basic density variation in open pollinated progenies of ***E.urophylla*** from Timor Island - Indonesia, at two sites in southern Brazil.

MATERIAL AND METHODS

The work was done from experiment of 4 year-old ***Eucalyptus urophylla*** S.T. Blake provenances planted in Belo Oriente (latitude 19°20'S, longitude 42°50'W, altitude 200m) and Linhares (latitude 19°20'S, longitude 40°04'W, altitude 50m) in the southern region of Brazil. The seeds were from 8 provenances, with different progenies number for Timor Island - Indonesia. To compare the basic density, three provenances were chosen, each one with 9 progenies. The origin characteristics of these progenies are found on Table 1.

TABLE 1: Altitudes of seed provenances origin of ***E. urophylla*** from Timor Island in Indonesia (latitude 9°36' to 9°43'S, longitude123°54' to 124°14'E).

Provenances	Altitude (m)	Progeny number
Lelogama	1100	T1,T2,T3,T4,T5, T6,T8,T9,T10
	1100	T11
Timau	1260	T16,T17,T18
	1300	T12,T13,T15,T19,T20
	1150	T35,T36,T38
Oebaha II	1200	T40,T41,T42,T43
	1250	T44,T45

In each locality the experimented design was compact family blocks with subplots consisted of 10 plants row and 3 replications. The spacing were 3.0 x 2.0m. The wood samples from 9 trees per progeny per site were extracted at dbh level by Pressler increment borer. The wood basic density was determined by maximum moisture content method.

Experimental analysis was done with GLM (General Linear Models) of SAS (Statistical Analysis System). The quantification of the relation between the sizes of the progenies in two sites was obtained using Spearman's coefficient of rank correlation.

Brazilian commercial populations were included as control, as showed in Table 2.

RESULTS AND DISCUSSION

Brazilian provenances used as control in the trial revealed superior or similar to the material from Timor in relation to the basic density, but a small genetic base was show as a restrict for their use (Table 2).

TABLE 2: Wood basic density, altitude, latitude and longitude of Brazilian commercial seed source of ***E. urophylla*** used as control.

Provenances	Altitude (m)	Latitude (S)	Longitude (W)	Wood basic density B.Oriente MG	Linhares ES
Salesópolis	880	23°32'	450°51'	0.459	0.446
Casa Branca	670	21°46'	470°04'	0.491	0.475
Camaquã	517	22°20'	480°59'	0.467	0.488
Linhares	50	19°22'	400°04'	0.463	0.454

The progenies from Timau and Oebaha II regions varied for the wood basic density when it is was analysed the progenies variation unfolding within provenances at the two sites. It is important to report that the variations in density for Oebaha II (Table 3) are superior to the difference among the density extremes, when considering anly the mean of provenances (BRASIL *et al.*1986). The two origins that revealed significative at the two sites had similar behavior in Belo Oriente and Linhares. Spearman correlation coefficient was 0.90 for Timau and 0.68 for Oebaha II, both of them

signicative at 5% of probability. This correlation shows few interaction between progenies and site,showing the genetic control on the wood density.

TABLE 3: Means (D) and variation coefficients of ***E. urophylla*** wood basic density among (CVm) and within (CV) Oebaha II provenance planted in Belo Oriente and Linhares-Brazil.

Oebaha II progeny	Belo Oriente D	CV(%)	Oebaha II progeny	Linhares D	CV(%)
T42	0.524	6.05	T38	0.538	10.21
T36	0.482	6.94	T42	0.522	5.92
T45	0.433	6.64	T36	0.512	10.68
T41	0.431	9.50	T35	0.509	7.57
T43	0.429	8.39	T43	0.459	5.84
T44	0.427	9.74	T45	0.457	4.92
T40	0.414	10.09	T40	0.441	12.09
			T44	0.426	9.77
				0.413	5.74
Mean	0.448			O.475	
CVm		8.18			9.06

Lelogama, a region where the best stands were found, presented differences among progenies only in Belo Oriente, but it was included in the analysis because it was the one that presented the greater progenies number of the experiment.

The differences among progenies density means confirm the possibility to detect genetic variation among them and select among progenies, in a second phase of the specie improvement program. In this phase, it would be desirable a more representative sampling with greater number of progenies as already suggested by WILCOX (1982a, 1982b) to ***E.regnans*** and ***E.fastigata***.

The average heritability coefficient for wood density at the

level of progenies average was 0.76, with values of 0.80 for Belo Oriente and 0.72 for Linhares.

The comparision of the basic density averages among and within the progenies from Oebaha II with Lelogama and Timau allow to state that the density variation coefficients within the progenies varied similary for the two sites (Tables 3, 4 and 5).

Oebaha II presented a greater variation coefficient among the progenies, suggesting greater variation among them (Table 3).

In spite of being known that there is great individual variation in eucalypt wood density (Ferreira & Kageyama 1978), the sampling of this work was not enough to detect variation at this level.

TABLE 4: Means (D) and variation coefficients of ***E. urophylla*** wood basic density among (CVm) and within (CV) Timau provenance planted in Belo Oriente and Linhares - Brazil.

Timau` progeny	Belo Oriente D	CV(%)	Timau progeny	Linhares D	CV(%)
T18	0.486	4.63	T18	0.471	7.66
T13	0.455	7.95	T13	0.469	6.42
T12	0.449	7.30	T20	0.456	7.86
T17	0.419	5.58	T17	0.456	8.79
T15	0.416	9.91	T19	0.436	11.16
			T12	0.434	7.76
			T16	0.424	6.56
			T15	0.420	7.96
			T11	0.400	9.16
Mean	0.445			0.441	
CVm		5.78			5.13

TABLE 5: Means (D) and variation coefficients of ***E. urophylla*** wood basic density among (CVm) and within (CV) Lelogama provenance planted in Belo Oriente and Linhares - Brazil.

Lelogama progeny	Belo Oriente D	CV(%)	Lelogama progeny	Linhares D	CV(%)
T4	O.478	9.11	T1	0.458	6.26
T5	0.464	7.30	T5	0.453	56.52
T8	0.452	11.72	T4	0.444	12.46
T1	0.437	8.84	T8	0.440	7.40
T3	0.429	7.34	T2	0.431	9.25
T6	0.419	5.29	T10	0.428	5.49
T10	0.418	10.48	T6	0.424	10.85
T2	0.412	5.26	T3	0.418	4.94
T9	0.396	8.88	T9	0.409	5.45
Mean	0.434			0.434	
CVm		5.73			3.52

CONCLUSIONS

E. urophylla wood basic density sampled at dbh with Pressler increment borer presented high heritability coefficient at the level of progenies averages. The progenies from three localities in Timor Island - Indonesia had similar behavior at the two planting sites, revealing little interaction between progenies and local. The greatest variations among progenies were found in Oebaha II. Brazilian provenances used as control presented basic density values similar to the progenies from Timor Island. Other papers will report investigations with greater number of progenies to evaluete the magnitude of wood basic density variations.

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