

BIOMASS PRODUCTION AND NUMBER OF SPROUTS FOR FOUR COMMERCIAL EUCALYPTUS HYBRID CLONES BY DIFFERENT WATER LAMINAS

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INTRODUCTION

The work was set up aiming to verify seedling biomass production of eucalypt hybrid clones when different water laminas of irrigation on clonal garden were used. The genus *Eucalyptus* belong to the family *Mirtaceae* with almost 900 species most of them are originally from Australia (BOLAND, 2006). Some species and hybrids are planted commercially throughout the world, on areas over 19 million hectares mainly for pulp and paper, fuel wood, fiber boards, and other uses.

In South America the commercial plantations are on large areas, especially with *Eucalyptus* (55%). Only in Brazil, the eucalypt culture represents a third of all the world. The eucalypt culture has been a good investment with high income rates of return, emerging as an important business in the 21st century, because of its rusticity, support of low soil fertility, low amount of rainfall, and large range of temperature variation (FLEXAS et al, 2002). The eucalypts have been cultivated in large proportions, in systems of sustainable managed forests. The culture is used extensively in Brazil to replace native forest, deforestation areas, because their good performance in different types of soil, that fast growth, with high production of wood yield (VELLINI, 2007).

Eucalyptus urophylla is natural from Indonesia (Timor island), growing approximately 45 m height, with 2 to 2,5m diameter, from 400 to 3000 m altitude, and average annual precipitation from 1000 to 1500 mm, tolerant from 8 to 29°C, with frost in short period. The species presents high wood yield and is conducted by the many genetic improvement programs (FERREIRA, 1999).

OBJECTIVE

The objective of the study was to evaluate the biomass production, number of sprouts, chlorophyll, and peroxidase enzyme of four commercial clones of *eucalyptus* hybrids under different water laminas of irrigation.¹

MATERIAL AND METHODS

The research was carried out in the nursery of Forest Science Department of São Paulo State University (UNESP) - Botucatu, São Paulo, Brazil, at 22°51'S, 48°27'W latitude and 786 m altitude. The local climate is classified of Cwa by Köppen, with warm temperature (mesothermic), rainfall through the summer, and dry winter (CUNHA et al., 1999).

Four commercial hybrid clones were studied: Clone A (*Eucalyptus grandis* x *E. urophylla* hybrid), clone B (*Eucalyptus grandis* x *E. urophylla* hybrid), Clone C (spontaneous hybrid of *E. saligna*), and Clone D (*Eucalyptus grandis* x *E. camaldulensis* hybrid).

The experimental design was randomized blocks, by split plot schedule, with three different water laminas (plot), four clones (subplot), and three replications, totalizing 2304 plants. The experiment was evaluated on December/2011 and January, February, and March/2012.

Three irrigation laminas of water per day, on plants of clonal garden were utilized: L1 of 4mm, L2 of 7mm, and L3 of 10mm.

After set up the clones on clonal garden, each 15 days the sprouts were harvested. Dry biomass of sprouts were obtained using dry chamber with 70 ° C,

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for 48 hours to obtain the dry matter of sprouts. Number of sprouts was also analysed and to evaluate chlorophyll amount we used FieldScout CM 1000 chlorophyll meter, with deflectancy of 700-840 nm luminosity.

RESULTS AND CONCLUSION

The number of sprout production under different water laminas presented no statistical differences through Tukey test at 5% probability; however, there were statistical differences between clones (Table 1 and Table 2). The clone C (spontaneous hybrid of *E. saligna*) presented the highest quantity of biomass, showing high dry matter and high sprout number, in December/2011. According to Godoy et al, 2008. when there are high luminosity and high temperature that is favorable to increase the assimilation of CO₂ and O₂ causing photosynthesis increase, and thus high biomass production (TAIZ, L.; ZEIGER, E., 2009). The hybrid clone of *Eucalyptus saligna* was considered tolerant to low temperature and hydric deficit showing the best results (IPEF, 2005), it do not presented intolerance to any water lamina.

The temperature average in December was of 24.1°C , and 23.4°C by January. The precipitation average in December was 4.6 and 11.9 mm by January.

The best chlorophyll concentration was in January when all climatic condition were good to plant growth, with high humidity and ideal temperature and precipitation.

The chlorophyll amount as well as Nitrogen were utilize the same procedure and the value obtained can detect the stress level the Nitrogen and the chlorophyll level because the close correlation between them (GODOY et al, 2008)).

Table 1. Average similitude of growth parameter by biomass production and number of sprouts for four commercial clones of *Eucalyptus* hybrids by different water laminas using Tukey test considering different clone.

MONTH	CLONE	SPROUT	SPROUT/PLANT	DRY BIOMASS	DRY BIOMASS/PLANT	CHLOROPHYLL
December/11	1	662.22 b	10.35 b	362.70 a	5.66 a	176.78 a
	2	631.33 b	9.84 b	379.57 ab	5.93 ab	197.41 b
	3	500.88 a	7.84 a	441.25 b	6.89 b	166.21 a
	4	772.22 c	12.06 c	410.91 ab	6.42 ab	165.10 a
January/12	1	608.88 a	9.53 a	169.11 a	2.64 a	217.13 a
	2	651.55 a	10.2 a	242.84 b	3.79 b	246.97 a
	3	569.33 a	8.91 a	198.06 ab	3.09 ab	237.93 a
	4	653.77 a	10.23 a	204.28 ab	3.19 ab	241.88 a
February/12	1	634.22 d	9.91 d	135.19 b	2.11 b	
	2	452.00 b	7.06 b	129.37 b	2.02 b	
	3	300.88 a	4.70 a	98.95 a	1.54 a	
	4	545.77 c	8.53 c	145.84 b	2.27 b	
March/12	1	455.11 a	7.11 a	108.75 a	1.69 a	
	2	575.11 b	8.98 b	150.66 b	2.35 b	
	3	444.00 a	6.94 a	141.42 ab	2.21 ab	
	4	500.44 ab	7.82 ab	130.42 ab	2.03 a	

Table 2. Average similitude of growth parameter by biomass production and number of sprouts for four commercial clones of *Eucalyptus* hybrids by different water laminas using Tukey test considering different water lamina

MONTH	LAMINA	SPROUTS	SPROUT/PLANT	DRY BIOMASS	DRY BIOMASS/PLANT	CHLOROPHYLL
December/11	4mm	642.83 a	10.03 a	381.02 a	5.95 a	175.19 a
	7mm	641.83 a	10.03 a	388.34 a	6.06 a	183.15 a
	10mm	640.33 a	10.01 a	426.46 a	6.66 a	170.78 a
January/12	4mm	645.33 a	10.09 a	217.63 a	3.40 a	253.04 a
	7mm	596.33 a	9.32 a	208.05 a	3.25 a	223.94 a
	10mm	621.33 a	9.73 a	185.05 a	2.89 a	230.04 a
February/12	4mm	480.33 a	7.50 a	123.31 a	1.92 a	
	7mm	480.66 a	7.51 a	127.04 a	1.98 a	
	10mm	488.66 a	7.63 a	131.66 a	2.05 a	
March/12	4mm	480.00 a	7.72 a	125.48 a	1.96 a	
	7mm	494.33 a	7.91 a	134.73 a	2.16 a	
	10mm	506.66 a	7.50 a	138.23 a	2.10 a	

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