Seedling growth of mamacadela (*Brosimum gaudichaudii* Trec.) on six different substrates.

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ABSTRACT: Seedling growth of mamacadela (*Brosimum gaudichaudii* Trec.) on six different substrates. Mamacadela (*Brosimum gaudichaudii*) is a native tree or a shrub largely used in traditional medicine in the Cerrado region. The roots of mamacadela contain the coumarins psoralen and bergapten, whose main use is in the treatment of skin dideases, such as vitiligo. Due to its commercial interest, Mamacadela has been intensive collected from the wild, having a strong anthropogenic exploitation pressure. Studies on propagation of this species are extremely necessary, since no horticulture technology is available so far. The main goal of this paper is to evaluate the growth and development of Mamacadela on six substrates. Seedlings were grown at Embrapa Cerrados nursery, Planaltina, DF, Brazil, from September, 2002 to September, 2003. Five substrate types were prepared from a basic mixture (MB) of subsoil from Red Latosol with clay texture plus thick sand from river in a proportion of 1:1 (S1=MB + 10% of cattle manure; S2=MB + 20% of cattle manure; S3=MB + 10% of cattle manure + 3 g/L of osmocote; S4=MB + 3g/L of osmocote; and S5=MB + 6g/L of osmocote), and a sixth treatment (S6) was prepared using only thick river sand plus 6g/L of osmocote. The experimental design was completely randomized with six treatments and five replications with three plants per plot. Height, stem diameter, roots (RDW), and aerial part dry weight (APDW) from seedlings was evaluated after twelve months. Substrate S6 showed the least values for all variables evaluated. Substrates S3 and S5 produced seedlings with tendency of higher aerial part dry weight and root dry weight. Both treatments did not differ from others in height and stem diameter. In the nursery phase, mamacadela has showed a higher investment in root growth than in the aerial part, which appear to be an adaptation related to the Cerrado dry season.

Key words: seedling growth, *Brosimum gaudichaudii,* substrates.

INTRODUCTION

The Brazilian Cerrado is rich in medicinal species which present morphological characteristics consisting of developed roots (“xylopodios”) and barks, which frequently accumulate pharmacologically active substances.

Mamacadela (*Brosimum gaudichaudii*) is a tree or a shrub largely used in traditional medicine in the Cerrado region. The alcoholic extract of roots is used to externally treat skin diseases, such as vitiligo (Almeida et al., 1998; Rodrigues & Carvalho, 2001; Lorenzi & Matos, 2002). The infusion of its roots is used as a blood depurative and to treat itching, and bronchitis.

Two furano-coumarins have been isolated (bergapten and psoralen) from roots of Mamacadela (Lorenzi & Matos, 2002). Bergapten is a photosensitive substance, which associated with the vitamins B1, B6 and A is used in the treatment of vitiligo, in form of topic solutions or cream (pomade), now being market as Viticromin ® (Bucher, 2002). The bergapten promotes the re-pigmentation of the affected tissues.

Due to its commercial interest, Mamacadela has been intensive collected from the wild, having a strong anthropogenic exploitation pressure (Vieira et al., 2002). Studies on propagation of this species are extremely necessary, since no horticulture technology is available. The main goal of this paper is to evaluate the growth and development of Mamacadela on six substrates.

METHOD

Seeds were collected from a unique Mamacadela tree at Porangatu region, Goiás state, and pre-germinated in 72 cells tray with commercial Plantimax substrate. Seedling were transplanted to plastic bags with the following specifications: 20cmx30cmx0.02mm, 4 L volume capacity, with drainage. Seedlings were grown at Embrapa Cerrados nursery at plain sunlight, Planaltina, DF, Brazil, from September, 2002 to September, 2003.

Five substrate types were prepared from a basic mixture (MB) of subsoil from Red Latosol with clay texture plus thick sand from river in a proportion of 1:1, and a sixth treatment was prepared using only thick river sand (Table 1).

The experimental design was completely randomized with six treatments and five replications with three plants per plot. Height, stem diameter, roots dry weight (RDW), and aerial part dry weight

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TABLE 1. Substrates and treatment description.

TREATMENT	DESCRIPTION
S1	MB + 10% of cattle manure;
S2	MB + 20% of cattle manure;
S3	MB + 10% of cattle manure + 3 g/L of osmocote*
S4	MB + 3g/L of osmocote;
S5	MB + 6g/L of osmocote.
S6	thick river sand + 6g/L of osmocote.

* Osmocote is a 6 months releasing; containing N (15%), P_2O_5 (10%), K_2O (10%), Ca (3,5%), Mg (1,5%), S (3%), B (0,02%), Cu (0,05%), Fe (0,5%), Mn (0,1%), Zn (0,05%) and Mo (0,004%);

TABLE 2. Analysis of variance (degree of freedom, Sum of Squares, and F test) of height, stem diameter, root dry weight, and aerial part dry weight.

Source	DF	Height	Stem Diameter	Root Dry Weight	Aerial Part Dry Weight
Substrate	5	46,8083**	0,6689*	14,1382**	13,5237**
Error	24	5,8667	0,2065	1,2390	3,1234
Total	29	-	-	-	-

* significant by F test at 5% probabability.
** significant by F test at 1% probabability.

TABLE 3. Average values of height, stem diameter, roots dry weight (RDW) and aerial part dry weight (APDW), from seedlings growing on six different substrates, after twelve months.

Substrates	Treatment description	Height (cm)	Diameter (mm)	APDW (g)	RDW (g)
S1	MB +10% of cattle manure	18,9 a[1]	3,3 ab	3,1 bcd	7,2 ab
S2	MB +20% of cattle manure	18,3 a	3,6 a	2,9 cd	7,4 ab
S3	MB +10% of cattle manure + 3 g/L of osmocote	18,5 a	3,2 ab	5,2 ab	8,7 a
S4	MB +3g/L of osmocote	18,2 a	3,6 a	4,0 bc	8,0 ab
S5	MB +6g/L of osmocote	21,3 a	3,6 a	6,2 a	9,3 a
S6	thick river sand +6g/L of osmocote	12,1 b	2,7 b	1,6 d	4,6 b
CV (%)		13,5	13,6	29,0	23,4

[1] Averages followed by the same letters do not differ statistically at 5% probability using Tukey test.

(APDW) from seedlings was evaluated after twelve months. Data was analyzed using analysis of variance and Tukey test.

RESULT AND DISCUSSION

The analysis of variance showed a significant effect among all treatments for all parameters evaluated (Table 2).

Substrates S3 and S5 produced seedlings with tendency of higher aerial part dry weight and root dry weight. Both treatments did not differ from others in height and stem diameter (Table 3). In the

nursery phase, mamacadela showed a higher investment in root growth than in the aerial part, which appear to be an adaptation related to the Cerrado dry season. The ratio between aerial part and roots growth was lower than 1.0, which indicates a higher probability of success in field transplanting of seedlings.

Substrate S6 showed the least values for all variables evaluated, due to the high lixiviation capacity of the sandy texture. This indicates that osmocote (6g/L) was not enough to supply the nutritional requirements of seedlings cultivated in sandy soils.

Among all variables studied, the dry root weight seems to be the more important, since roots are used as medicine. Considering the high cost of osmocote (US$6.00/Kg), it appears to be more reasonable to produce mamacadela seedlings using a medium texture soil as substrates, fertilized with 10 to 20% of cattle manure. Machado and Parente (1986) and Lorenzi (2002) recommend the production of mamacadela seedlings in an organic-sandy substrate and in Cerrado soils, respectively, both authors reporting the low growth of mamacadela seedlings. Silva et al. (2001) also recommend the use of soils with medium texture plus 10% cattle manure for the production of native fruits from Cerrado, including mamacadela.

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