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RESEARCH ARTICLE

SUBSTRATES AND TYPES OF CUTTINGS OF *LIPPIA alba* (MILL) N. E. BROWN

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A B S T R A C T

Three experiments were conducted to evaluate the best type of cuttings and substrate for the propagation of *Lippia Alba*. In the first treatments were a) medians cuttings without leaves; b) with four leaves; c) with two leaves at the bottom; d) with two leaves at the top. In the second treatments were a) cuttings with leaves; b) middle cuttings with two leaves; c) middle cuttings without leaves; d) Median cuttings with leaves. In the third experiment the treatments were a) sand; b) sand garden with manure; c) sand garden with goat manure and d) arisco. A higher number of leaves (16. 25), root length (10cm) and survival (100%) on the cuttings with four leaves. Median cuttings without leaves showed the highest survival rate (100%). The propagation of L. Alba can be made with middle cuttings with four leaves and sand substrate.

INTRODUCTION

Lippia Alba (Mill.) N. E. Brown is a subshrub belonging to the spontaneous occurrence of Verbenaceae family in all regions of Brazil. It has soothing properties, soft spasmolytic, analgesic, sedative, anxiolytic and slightly expectorant (Lorenzi and Matos, 2008; Tavares *et al*, 2011; Mamun- Or-Rashid *et al,* 2013). *L. alba* is a promising plant for the pharmaceutical, aromatic and perfumes and may also be indicated for agricultural chemical industries due to its proven antifungal properties, insecticide and repellent (Yamamoto, 2008).

Most studies of medicinal plants in Brazil has been carried out with exotic plants and, when it comes to native medicinal plants and the studies are scarce and comprehensive. The lack of agronomic information on medicinal plants is not a problem only in Brazil but also in other countries (Jannuzzi *et al,* 2010). *L. Alba* propagates by cuttings and this form of vegetative propagation is the development of a new plant forming apical buds and adventitious roots, providing the production of clones (Pinto and Franco, 2009). Rooting is one of the main methods of propagation due to the advantage of maintaining the genetic characteristics of the mother plant, and also the difficulty in obtaining seeds (Biasi and Costa, 2003).

One factor that influences the vegetative propagation is the type of substrate and the quality of the substrate is a determining factor for success in rooting cuttings in many species (Lima *et al*, 2003), as growth depends on physical and chemical conditions substrate used and reserve substances that the plant uses for division and cell elongation of the roots (Pescador *et al*, 2007).

Biasi and Costa (2003) reported that the *L. Alba* cuttings present variation in the percentage of rooting varies when the substrate and the type of cutting used. Studies Tavares *et al*, (2012) indicated apical and basal cuttings for propagation of *L. Alba* and recommended the use of commercial substrate with carbonized rice straw and cattle manure for better production of fresh and dry root. Given these results, it is necessary to evaluate certain characteristics in vegetative propagation for the production of seedlings of this species. This work aimed to evaluate types of cuttings and different substrates in the vegetative propagation of *Lippia Alba*.

MATERIALS AND METHODS

Location and duration of study

The experiment was conducted at the University of International Integration Lusophone African Brazilian, UNILAB, on the campus of Liberty, located in Redenção, Ceara State, coordinates 4°13'33 "S and 38°42'40"W. The city has hot humid tropical climate and subsumed and warm tropical semi-arid, with an average temperature of 26 °C to 28 °C and rainfall density 1062 mm. Cuttings of *Lippia alba* (Mill) N. E. Brown were obtained in breeding plants grown in the municipality of Acarape, State of Ceara. Three experiments were conducted.

Experimental design and analysis

In experiment 1 was used completely randomized design with four treatments and five replications of ten cuttings. The cuttings were placed on polystyrene trays multicellular, rectangular, measuring 0.54 m long and 0.28 m wide with 50 pyramidal cell substrate and filled with sand. The treatments were a) medians cuttings without leaves; b) middle cuttings

with four leaves; c) middle cuttings with two leaves at the bottom; d) median cuttings with two leaves at the top.

In the second experiment it was used a completely randomized design with four treatments and five replications of ten cuttings. The cuttings were placed on polystyrene trays multicellular, rectangular, measuring 0.54 m long and 0.28 m wide with 50 pyramidal cell substrate and filled with sand. The treatments were a) cuttings with leaves; b) middle cuttings with two leaves on top; c) middle cuttings without leaves; d) median cuttings with leaves.

In experiment 3 was used completely randomized design with four treatments and five replications of ten cuttings. The cuttings were placed on polystyrene trays multicellular, rectangular, measuring 0.54 m long and 0.28 m wide with 50 cells pyramidal shape and filled with the substrates. The treatments were a) sand; b) sand garden with manure; c) sand garden with goat manure and d) arisco.

After planting the cuttings trays were kept in a shady place, and made daily irrigations. We evaluated the number of leaves characteristics, root length, root volume, root number and length of the cutting. The data were submitted to analysis of variance by SISVAR software (Ferreira, 2008).

RESULTS AND DISCUSSION

The results of the evaluated characteristics are shown in Tables 1, 2 and 3. A higher number of leaves (16.25), root length (10cm) and survival (100%) of the cuttings with four leaves (Table 1)

Table 1 Characteristics of *Lippia Alba* cuttings With and without leaves

Type of cutting	budding length (cm)	budding number	leaves number	root lenght (cm)	Survival (%)
Cuttings without leaves	2,14b	2,75a	8,04b	8,01b	80b
Cuttings with four leaves	3,24a	2,48a	16,25a	10,00a	100a
Cuttings with two leaves at the bottom	3,33a	1,91b	9,99b	8,17b	80b
Cuttings with two leaves on top	2,46b	2,50a	11,12b	7,87b	80b
CV%	18	20	17	18	21

Means followed by the same letter in the column do not differ by Tukey test at 5% probability.

The cuttings without forming leaves have lower roots as expected, resulting in a lower rate of survival of same. The greatest length of the roots can directly influence the development of changes in the nursery and transplanting later in the field due to greater capacity to absorb water and nutrients. The presence of leaves on the cuttings was essential to stimulate root growth, as observed for *L. Alba* by Lolli (2001).

According to Oliveira *et al*, (2011) the presence of leaves enables the production of assimilates and plant hormones, which are essential in the process of rooting and growth of shoots mainly for small cuttings, with reduced amount of reserves, as with plant cuttings medicinal herbs. The median cuttings without leaves were those with the highest survival rate (Table 2). This suggests that the cuttings grow best when they have reserves of nutrients and do not provide this reserve for the growth of leaves providing nutrients only as budding occurred. The same result was observed by Ehlert (2003) working with cuttings of *Ocimum gratissimum* L. found that the highest percentage of rooting occurred median cuttings without leaves.

Table 2 Characteristics of *Lippia Alba* cuttings Collected in different positions in the branch

Cutting type	budding length (cm)	number of sprouts	number of leaves	root length (cm)	survival percentage
Apical cuttings with leaves	2,5a	1,0b	7,0b	7,0a	80b
Cuttings medians with two leaves on top	0,8b	2,3a	8,9b	6,1a	70b
Cuttings medians leafless	3,3a	1,9a	10,5a	7,0a	100a
Cuttings medians with leaves	1,2b	2,2a	10,2a	6,2a	80b

Means followed by the same letter in the column do not differ by Tukey test at 5% probability.

Duarte *et al*, (2002) showed that the type of cuttings used for the propagation of *L. Alba* can be median and baseline (0.41 and 0.77 cm in diameter, respectively), but the middle cuttings showed higher sprouting capacity and better trend rooting. According to Lima *et al*, (2015) to *L. alba* species can be considered a kind of easy rooting, so can its vegetative propagation using different types of cuttings, but the cuttings with leaves had a higher percentage of rooting.

The arisco substrate and garden sand with goat manure was that provided less rooting, with average percentage of 70% (Table 3). The sand was the substrate where higher number of shoots and leaves, but the root length did not change the substrates sand and sand garden with manure. Aeration is essential for root respiration and plant growth and possibly sand substrate provided better aeration. Lima *et al*., (2015) found that the sand provided greater development of *L. Alba* cuttings and attribute this result to greater aeration.

Table 3 Characteristics of *Lippia Alba* cuttings in different substrates

Substrate	budding length (cm)	number of sprouts	number of leaves	root length (cm)	survival percentage
Sand	1,40b	3,04a	24,04a	10,77a	100 a
Garden sand with cattle manure	2,96a	2,11b	16,44b	10,10a	100 a
Garden sand with goat manure	1,64b	1,36c	13,24c	9,13a	70 b
Arisco	1,54b	1,72c	13,47c	7,13b	72b
CV%	15,34	16,45	18,56	17,43	16,78

Means followed by the same letter in the column do not differ by Tukey test at 5% probability.

CONCLUSION

The rooting of cuttings and the formation of *L. Alba* plants may be favored with the use of middle cuttings with four leaves and sand substrate.

References

Biasi, L.A and Costa, G. 2003. Propagação vegetativa de *Lippia Alba*. Ciencia Rural, 33(3), 455-459.

Duarte, E.F. Oliveira Júnior, E.D. Bigarelli, L.F.G. Almeida, C.S. Silva, L.C. Assis, S.R.F. 2002. Enraizamento de estacas de produção de biomassa de *Lippia Alba* (Mill) N.

E. Brown (Verbenaceae). Revista Científica Eletrônica de Agronomia, 1(2), 1-4.

Ehlert, P.A.D. 2003. Épocas de plantio, idades e horários de colheita Na produção e qualidade do óleo essencial de *Lippia Alba* (Mill.) N. E. Br., quimiotipo limoneno-carvona. 106p. Tese (Doutorado em Agronomia) - Universidade Estadual Paulista Júlio de Mesquita Filho, Faculdade de Ciências Agronômicas, Botucatu.

Ferreira, D.F. 2008. SISVAR: um programa para análises e ensino de estatística. Revista Symposium 6, 36-41.

Jannuzzi, H. Mattos, J.K.A. Silva, D.B. Gracindo, L.A.M. Vieira, R.F. 2011. Avaliação agronômica e química de dezessete acessos de erva-cidreira [*Lippia Alba* (Mill.) NE Brown] - quimiotipo citral, cultivados no Distrito Federal. Revista Brasileira de Plantas Medicinais, 13(3), 258-264.

Lima, C.B. Boaventura, A.C. Gomes, M.M. 2015. Cuttings of *Lippia Alba* with emphasis on time for seedling formation, substrates and plant growth regulators. Horticultura Brasileira, 33(2), 230-235.

Lima, N. Biasi, L.A; Zanette, F and Nakashima, T. 2003. Produção de mudas por estaquia de duas espécies de guaco. Horticultura Brasileira, 21(1), 106-109.

Lolli, A.P.O. 2001. Influência do ciclo do indolbutìrico no enraizamento de estacas semilenhosas de *Lippia Alba* (Mill.) N.E.Br. In: Jornada Paulista de Plantas Medicinais, 5. 2001, Botucatu-SP. Anais. Botucatu: UNESP. 2001. P.112.

Lorenzi, H and Matos F.J. A. 2008. Plantas Medicinais no Brasil Nativas e Exóticas. 2a Ed.São Paulo: Instituto Plantarum de Estudos da Flora Ltda.

Mamun-Or-Rashid, A.N.M. Sen, M.K. Jamal, M.A.H.M, Nasrin, S.A 2013. Comprehensive ethno-pharmacological review on *Lippia Alba* M. *International Journal of Biomedical Materials Research*. 1(1), 14-20.

Oliveira, L.M. Nepomuceno, C.F. Freitas, N.P. Pereira, D.M.S. Silva, G.C and Lucchese, A.M. 2011. Vegetative propagation of Hyptis leucocephala Mart. ex Benth and Hyptis platanifolia Mart. ex Benth. Revista Brasileira de Plantas Medicinais, 13(1), 73-78.

Pescador, R. Voltone, A.C, Girardi, C. G. OSA, F.A.F. 2007. Estaquia de Pariparoba-do-Rio Grande do Sul sob efeito do ácido indol-butírico em dois substratos. Scientia Agraria, 8(4), 391-398.

Pinto, F.A and Franco, E.T.H. 2009. Propagação Vegetativa de *Lippia Alba* (Mill.) N.E. Brown (Verbenaceae). Caderno de Pesquisa Série Biologia, 21(2), p. 61-75.

Tavares, I.B. Momenté, V.G. Nascimento, I.R.D. 2011. *Lippia alba*: estudos químicos, etnofarmacológicos e agronômicos. Revista Brasileira de Tecnologia Aplicada nas Ciências Agrárias, 4(1), 204-220.

Tavares, I.B. Momnté, V.G. Barreto, H.G. Castro, H.G. Santo, G.R. Nascimento, I.R. 2012. Tipos de estacas e diferentes substratos Na propagação vegetativa da erva cidreira (quimiotipos I, II e III). *Bioscience Journal*, 28(2), 206-213.

Yamamoto, P.Y, Colombo, C.A. Azevedo Filho, J.A. Lourenção, A.L. Marques, M.O.M. Morais, G.D.S. Chiorato, A.F. Martins, A.L.M and Siqueira, W.J. 2008. Performance of ginger grass (*Lippia Alba*) for traits related to the production of essential oil. Scientia Agricola, 65(5), 481-489.

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