Effect of Substrata on the Development of Stem Cuttings of *Lippia alba* (Mill.) N. E. BR. - Limonene-Carvone Chemotype

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Abstract

Studies were conducted to show the effect of different substrata on the development of stem cuttings of *Lippia alba* made of limonene-carvone chemotype. The experiment was done in the College of Agronomical Sciences, UNESP, Botucatu, SP, Brazil in 2000. The cuttings were planted in polystyrene trays consisting of 72 cells. The cuttings had about 0.20 m of length and were put in the following substrata:

- Fine sand (T1),
- Commercial substratum (T2),
- Carbonised rice peel and local soil (T3),
- Local soil, cow manure and carbonised rice peel (T4),
- Vermiculite (T5),
- Carbonised rice peel (T6).

After 40 days the development of stem cuttings were evaluated. High rate of rooting of stem cuttings was verified, with average of 95% and no significant difference between the treatments. In relation to dry mass of aerial parts and dry mass of roots, significant differences were found. For dry mass production of aerial parts the commercial substratum (T2) and the local soil, cow manure, carbonised rice peel (T4) were optimal. For mass of roots the local soil, cow manure, carbonised rice peel (T4) proved to be the best.

INTRODUCTION

*Lippia alba* or, “cidreira,” belongs to the family Verbenaceae, native to South (Brazil) and Central America. The genus is rather diverse having many related species, for example: *L. geminata, L. nodiflora, L. citriodora*, etc. (Pio Corrêa, 1984).

More detailed investigations are needed on the genus *Lippia* because of the lack of data available on the chemical composition of *Lippia* populations, originating from different areas, and the lack of information on methods of cultivation.

Matos (1998) reported that there are three chemotypes, having different chemical components in their essential oils. Correia (1998) reported his results on rooting, which can be an important factor from the point of view of multiplication. The importance of substrata water retention capacity, porosity, aeration ability, low level of salts, nutritious, sterility from diseases, nematodes and other pathogenic agents were justified.

Many different substrata, purged soil of ravine, turf, vermiculite and wood powder were used for rooting with success (Covillon, 1988 Hartmann and Kester, 1982). In the case of atemòia (*Annona cherimola* Mill. x *A. squamosa* L.) Ferreira and Cereda (1999) found that vermiculite and Plantmax (commercial substratum) are the most appropriate substrata for rooting.

In the present work we are looking for substrata that promote rooting, as well as development of stem cuttings made of cidreira belonging to limonene-carvone chemotype.

MATERIAL AND METHODS

The experiment was started in 27/10/2000 in the nursery at the Experimental Farm Lageado, of the Agronomical Sciences College (UNESP University–Botucatu) SP, Brazil (Fig. 1-3).

The design of experiment was randomised blocks, with six treatments and five
replications. The reaction of 12 stem cuttings was tested in each treatment. The treatments were as follows:

- **T1** - fine sand,
- **T2** - commercial substratum,
- **T3** - carbonised peel of rice and local soil (1:1),
- **T4** – local soil and cow manure and carbonised peel of rice (3: 1:1),
- **T5** - vermiculite,
- **T6** - carbonised peel of rice.

The stem cuttings were obtained from plants grown in the Medicinal Plant Garden of the University. The stem cuttings were 0.20 m long, approximately, from which all the leaves were removed. The cuttings were planted into the trays containing 72 cells, filled with different substrata.

40 days after planting the stem cuttings were removed carefully to avoid losses of the aerial part and radicular system. Both the aerial parts and radicular systems were dried at 40 °C for 48 hours and weighed afterwards.

The evaluated parameters were as follows: rooting percentage, mass of the dry matter of the aerial part, and mass of the root.

**RESULTS AND DISCUSSION**

A high level of rooting was obtained, with values as high as 95 %. However, there were no significant differences among plants which were grown on diverse substrata. Although substratum T4 (local soil + cow manure + carbonised peel of rice) proved to be the best substratum and the rooting rate reached 98.33 % on average. In relation to the dry mass, significant difference in production of sprouts and roots was observed (Table 1).

The maximum values of stem and leave were obtained using commercial substratum. With relation to the dry mass of root, the best results were obtained with mixture of local soil, cow manure and carbonised peel of rice. The advantage of mixture of local soil, cow manure and carbonised peel of rice is the low C/N ratio (5:1), which provides high availability of nutrients and good physical and structural conditions.

The importance of different substrata in promotion of rooting has been demonstrated in many other species, including *Citrus* (Soprano and Koller, 1991, Donadio, 1991), *Malpighia glabra* (Germano et al., 1994) and yellow passion fruit (Lima et al., 1997). There is no question, however, that for the propagation of *Lippia alba*, especially that of limonene–carvone chemotype, the substratum of local soil, cow manure and carbonised peel of rice can be recommended, exclusively, for the practical production of stem cuttings.

**Literature Cited**


Matos, F.J.A. 1998. Farmácias Vivas, EUFC

**Tables**

Table 1. Dry mass production of stem cuttings of *Lippia alba*, in different substrata (Botucatu –SP, Brasil, 2001.)

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Dry mass (g)</th>
<th>Rooting (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stem</td>
<td>Leave</td>
</tr>
<tr>
<td>T1 - Sand</td>
<td>1.6660 a</td>
<td>0.3140 b</td>
</tr>
<tr>
<td>T - 2 CS</td>
<td>1.6160 a</td>
<td>0.5220 b</td>
</tr>
<tr>
<td>T - 3 LS + PCR</td>
<td>1.6920 a</td>
<td>0.3360 b</td>
</tr>
<tr>
<td>T - 4 LS + CM + PCR</td>
<td>1.3740 a</td>
<td>0.5220 a</td>
</tr>
<tr>
<td>T - 5 V</td>
<td>1.7380 a</td>
<td>0.3040 b</td>
</tr>
<tr>
<td>T - 6 PCR</td>
<td>1.5000 a</td>
<td>0.3080 b</td>
</tr>
<tr>
<td>CV (%)</td>
<td>19.60</td>
<td>23.22</td>
</tr>
</tbody>
</table>

CS = commercial substratum, LS + PCR = local soil + carbonised peel of rice, LS + CM + PCR = local soil + cow manure + carbonised peel of rice. V = vermiculite, PCR = carbonised peel of rice. Means followed by same letter in column are not statistically different, by test Tukey’s HSD (P=0.05).

**Figures**

Fig. 1. A *Lippia alba* stand
Fig. 2. General view of experiment

Fig. 3. Rooting on different substrata