INFLUENCE OF DIPPING TIME IN WATER AND OF GROWTH REGULATORS ON THE GUACO (Mikania glomerata Spreng.) VEGETATIVE PROPAGATION

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Abstract

Guaco is a climbing vine of Asteraceae family that is popularly used for the treatment of respiratory problems. The objective of this work was to evaluate the influence of dipping in water, stem cutting position and the use of growth regulators on the rooting of stem cuttings. The experiments were carried out in greenhouse in October 1995. The treatments of the first experiment were applied to cuttings from the different positions of the stem (apical, medium and basal). Each set of three cuttings was then dipped in water for one, twelve and twenty four hours, respectively. The influence of dipping in water and growth regulators was evaluated in another experiment. The average stem size was 1.5 to 2.0 m which was divided in three parts (apical, medium and basal). Stem cuttings maintained two half leaves and were 15 cm in size. This vegetative material was submitted to dipping treatments and planted in pots of washed sand. After 40 days, the root weight, stem weight and rooting percentage were evaluated. The treatment with one hour of dipping increased the rooting percentage averages, except for the basal stem cuttings. The rooting percentage varied between 62.5 to 100%, according to the treatment. The best averages were verified on treatments of dipping in water (95%) and in indole-3-propionic solution (93%). The indole-3-butyric acid reduced the rooting percentage average (81%).

Resumen

El guaco es una enredadera perteneciente a la familia de las Asteráceas, utilizada por la población para tratamiento de asma, tos y dolores reumáticos. El objeto de este trabajo fue evaluar la influencia de la hidratación previa, posición de la estaca en el tallo y aplicación de fitorreguladores sobre el enraizamiento de tallos en arena. Se realizaron dos ensayos con tratamientos combinando estacas obtenidas de la región apical, mediana y basal del tallo; hidratación por cero, una, doce y veinticuatro horas; y aplicación de los fitorreguladores ácido indolbutírico y ácido indolpropiónico a 250 ppm por una hora. El experimento se realizó en invernadero, en octubre de 1995. Ramas de 1,5 a 2,0 m se dividieron en tres partes iguales, denominadas apical, mediana y basal. Se estandarizó el tamaño de las estacas en 15 cm, manteniéndose dos hojas cortadas al medio en cada estaca. En seguida, las estacas se sometieron a la combinación de los tratamientos prevista y se pusieron para enraizar en macetas con arena lavada. Luego de 40 días, se determinó el peso de la raíces, peso de los brotes y porcentaje de enraizamiento. No hubo influencia de los tratamientos sobre el peso de las raíces y peso de los brotes. La hidratación previa por un mínimo de una hora aumentó expresivamente el porcentaje de enraizamiento en las estacas de la porción apical, pero no tuvo influencia sobre las
estacas medianas y basales. El porcentaje de enraizamiento varió del 62.5% en estacas apicales sin hidratación, al 100% en otras distintas combinaciones de tratamientos. El ácido indolbutírico en la concentración utilizada redujo el porcentaje de enraizamiento. El promedio del porcentaje de enraizamiento con ácido indolbutírico fue del 81%; con ácido indolpropiónico fue del 93% y en agua fue del 95%.

1. Introduction

Guaco is a medicinally important vegetal species of Asteraceae family (Corrêa, 1984). This climbing vine plant is used in the treatment of respiratory problems. The Brazilian Ministry for Health has included this species in the Research Program of Medicinal Plants as one of the priority species for studies (Oliveira et al., 1987).

Although the propagation by seeds of this plant is possible (Pereira et al., 1995; Scheffer et al., 1997), the majority of planting techniques suggests propagation by stem cuttings (Almeida et al., 1990; Figueira et al., 1991; Corrêa Júnior et al., 1991). The study of this type of propagation is very important for the northern region of Brazil because Guaco produces no flowers there (Matos, 1989). Results of rooting percentage in water between 80 and 100%, according to the size of the stem cuttings, have been obtained. UNICAMP (1990) obtained 70% of rooting percentage by using earth, sand and manure as substrate. The objective of this work was to evaluate the influence of dipping time, stem cutting positions and growth regulators on stem cutting rooting of Guaco in pots of washed sand.

2. Material and Methods

The vegetal material for these experiments was obtained from plants cultivated in Curitiba, PR, (25° S, 49° W, 947 m a.s.l) from seeds of plants from Morretes, PR, (25° S, 48° W, 50 m a.s.l.). Stems of 1.5 to 2.0 m were divided into three parts (apical, medium and basal). The stem cutting size was 15 cm and two half leaves were maintained. The first experiment evaluated the stem cutting position and dipping time (0; 1; 12 and 24 hours). The use of growth regulators was evaluated in a second experiment by dipping the stem cuttings in solutions of indol-3-butyric acid (1.2 mM) and indole-3-propionic acid (0.75 mM) and water for one hour. After the dipping time treatments, the stems cuttings were planted in pots of washed sand, remaining in greenhouse for a period of 40 days. At the end of this time, the root weight, stem weight and rooting percentage were determined. The analysis of variance was made in factorial design.

3. Results

3.1 Experiment 1

The dipping treatments increased the rooting percentage and this influence was greater on apical stem cuttings (Table 1). There was no interaction between dipping time and stem cutting position. On cuttings from apical and medium positions, the dipping was found to be necessary. However, no difference was observed in rooting percentages in so far as the different dipping times. On basal position cuttings, dipping treatments featured no differences. According to the results, no difference was verified between the treatments in relation to the weights of root and stem.
3.2 Experiment 2

The best rooting percentages were obtained from dipping in indol-3-propionic acid solution and in water. The concentration of indol-3-butyric acid used in this experiment decreased the rooting percentage (Table 2). This result also shows that the use of growth regulators (indol-3-butyric - 1.2 mM - or indole-3-propionic - 0.75 mM) is not necessary to induce rooting of stem cuttings of guaco.

4. Discussion

The experiments showed that dipping is necessary for stem cuttings of apical and medium positions. Deschamps & Pinto (1996) obtained similar results with Sebastiana schothiana (Muell. Arg.) Muell. Arg. stem cuttings when the best results for rooting were achieved in basal stem cuttings. Matos & Vieitez (1986) achieved greater rooting percentages for basal stem cuttings of Castanea sativa P. Miller relating this result to greater auxin protector activity. The results obtained in the first experiment could also be related to the water content of young tissues of apical and medium positions. In so far as the use of growth regulators, the experiment showed that the rooting percentage obtained by dipping in water was higher than by using of indole-3-butyric and indole-3-propionic acid concentrations. This result suggests the need for further studies in relation to growth regulator concentrations and dipping time.

5. References

UNICAMP - Centro Pluridisciplinar de Pesquisas Químicas, Biológicas e Agrícolas. 1990. Estudo agronômico de Mikania glomerata. In: Estudo agronômico de plantas
brasileiras dotadas de atividade farmacológica. Paulínia: CEME/ UNICAMP/ CPQBA, 14-18 datilografado.

Table 1 - The influence of dipping time and the position of the stem cutting on the rooting of Guaco (*Mikania glomerata* Spreng.)

<table>
<thead>
<tr>
<th>Position of stem cuttings</th>
<th>Apical</th>
<th>Medium</th>
<th>Basal</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dipping time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zero</td>
<td>62.50</td>
<td>68.75</td>
<td>88.75</td>
<td>73.30</td>
</tr>
<tr>
<td>1 h</td>
<td>88.75</td>
<td>100.00</td>
<td>95.00</td>
<td>94.50</td>
</tr>
<tr>
<td>12 h</td>
<td>100.00</td>
<td>82.50</td>
<td>78.75</td>
<td>87.00</td>
</tr>
<tr>
<td>24 h</td>
<td>85.00</td>
<td>100.00</td>
<td>90.00</td>
<td>91.70</td>
</tr>
<tr>
<td>Average</td>
<td>84.06</td>
<td>87.81</td>
<td>88.12</td>
<td></td>
</tr>
</tbody>
</table>

C.V. 12.28%

(*) Averages followed by the same letter do not differ from each other in the 1% probability level by the Tukey test

Table 2 - Influence of growth regulators and position of the stem cuttings on the rooting Guaco (*Mikania glomerata* Spreng.)

<table>
<thead>
<tr>
<th>Position of stem cuttings</th>
<th>Apical</th>
<th>Medium</th>
<th>Basal</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dipping in</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>88.75</td>
<td>100.00</td>
<td>95.00</td>
<td>94.58</td>
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<td>IBA</td>
<td>78.75</td>
<td>85.00</td>
<td>78.75</td>
<td>80.83</td>
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<tr>
<td>IPA</td>
<td>88.75</td>
<td>90.00</td>
<td>100.00</td>
<td>92.92</td>
</tr>
<tr>
<td>Average</td>
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<td>91.67</td>
<td>91.25</td>
<td></td>
</tr>
</tbody>
</table>

C.V. 9.8%

(*) Averages followed by the same letter do not differ from each other in the 5% probability level by the Tukey test