VEGETATIVE PROPAGATION OF *LEUCOSPERMUM* - a comparative study at the developmental and tissue levels after different treatments

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INTRODUCTION

-. *Leucospermum* R.Br. is a genus of the Proteaceae family whose inflorescences play an essential role in the cut flower trade worldwide. In the Canary Islands, they are an import crops in mid-altitude rural areas, whose future depends on obtaining high quality plants quickly, in quantity, applying techniques involving propagation through cuttings. This research was carried out in the glasshouse of the Agricultural Engineering Section and the Cellular Biology laboratory at La Laguna University. The aim was to determine the effect of indole butyric acid (IBA), hydrogen peroxide (H_2O_2) and SEFEL (Acosta, 2013), in treatments alone or in combination, on the vegetative propagation with terminal cuttings of the cultivars of *Leucospermum* `High Gold´, *L.* 'Spider', *L.* 'Succession II' and *L.* 'Tango'. Their responses were examined by light microscopy.

MATERIAL & METHODS

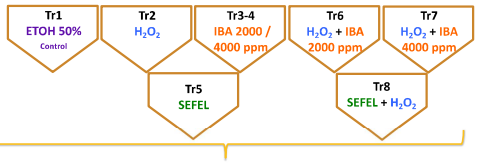
L. 'High Gold'

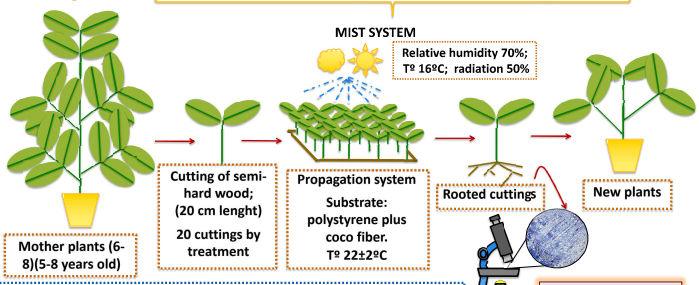
L. 'Spider' *L.* 'Succession

L. 'Tango'

VEGETATIVE PROPAGATION

What were the treatment (Tr) applied?





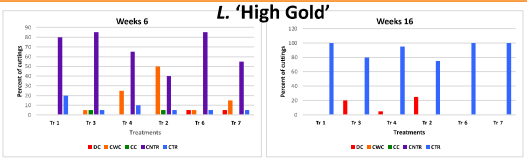
Light microscope

Histological analysis

Fixation in aldehyde compounds of the samples (2-3 cm); embedding in paraplast or resin; cutting with microtome (10µm - 1µm); staining with safranine/fast green or toluidine blue.

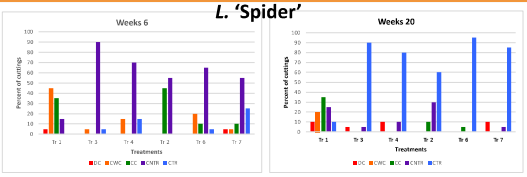
In the different stages of trials, dead cuttings (DC), cuttings without callus (CWC), cuttings with callus (CC), cuttings with non-transplantable roots (CNTR) and cuttings with transplantable roots (CTR) were evaluated:

L. 'High Gold'



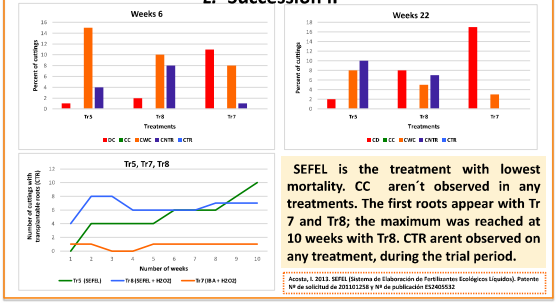
The data depends on the treatments; with all, at six weeks there were already cuttings with non-transplantable root. And on the eighth, they presented cuttings with transplantable roots. Tr7 reached 100% at the twelfth week. The length of the transplantable root was 3.5 cm.

L. 'Spider'



High percentage of CWC (in base of the cuttings and area removed leaves) in all treatments, decreasing progressively. The highest numbers with Tr2: 45% and Tr1: 35%. The maximum value Tr1: 55%, in week 16.
At 6 weeks, CNTR was observed with all treatments, being the highest Tr3 (90%).
At the beginning, 25% of CTR was recorded with Tr7 and lower with the others. The percentages increased reaching the maximum values 95% with Tr6.

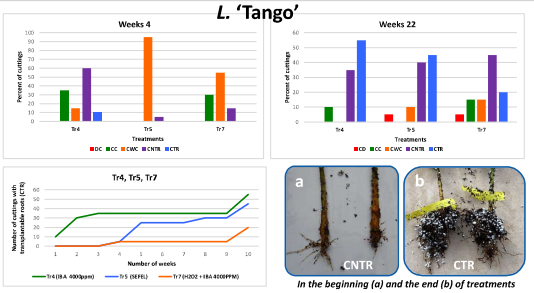
L. 'Succession II'



SEFEL is the treatment with lowest mortality. CC aren´t observed in any treatments. The first roots appear with Tr 7 and Tr8; the maximum was reached at 10 weeks with Tr8. CTR arent observed on any treatment, during the trial period.

Acosta, I. 2013. SEFEL (Sistema de Elaboración de Fertilizantes Ecológicos Líquidos). Patente. Nº de solicitud de 201012258 y Nº de publicación ES2403532

L. 'Tango'



In the beginning (a) and the end (b) of treatments

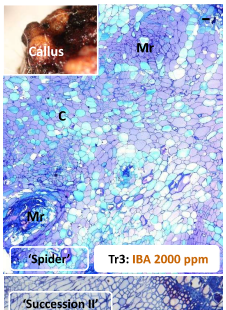
DC are observed from week 12 with Tr5 and Tr7. There are practically no calluses, and appeared in the areas of withdrawal of the basal leaves. The highest percentage was obtained with Tr 7.
At 10 weeks, the number of CNTR is high and decreases as the CTR increase, reaching 55% at week 22, with Tr4.

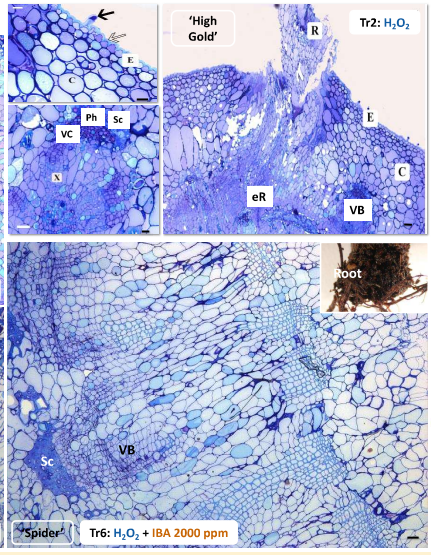
RESULTS

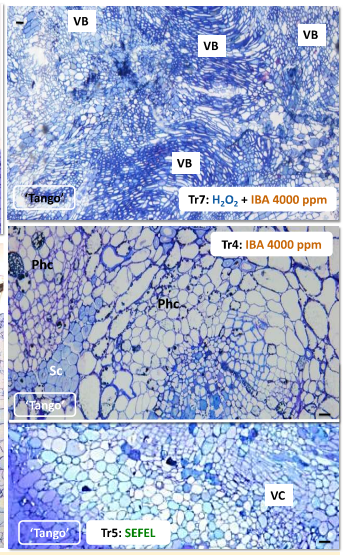
The cross sections of the cuttings (CTR, CNTR) showed structural modifications attributable to the conditions applied in the different treatments: presenting lengthening of the vascular bundles, total disorganization of the tissues due to the different planes of cell division, and greater meristematic activity in the cambial area, in the parenchymatous cortex, as well as an increase in phenolic compounds.

Cutting with roots in the end of treatments. - Light microcopy -

The tissues organization in the cuttings after different treatments







Abbreviations.- C: Cortex; E: Epiderms; eR: emergy Root; Mr: Meristemoids; Phc: Phenolic compounds; Ph: Phloem; R : Root; Sc: Sclerenchyma; VB: Vascular Bundles; VC: Vascular Cambium; X: Xylem; black arrow: trichome; white arrow: cell-wall. Graphic barre: 25 µm

CONCLUSIONS

The different treatments, alone or combined, produced transplantable cuttings (CTR) in three of the cultivars, except in *L.* 'Succession II'.

The highest percentages of CTR were obtained in *L.* 'High Gold' with the combination of H_2O_2 + IBA-4000 ppm, in *L.* 'Spider' through the use of H_2O_2 + IBA-2000 ppm, and in *L.* 'Tango' with IBA-4000 ppm.

Conversely, *L.* 'Succession II' with SEFEL was the most favourable, with lower cutting mortality (DC) and higher non-transplantable roots (CNTR).

The treatments led to a series of anatomical changes in the stem-cuttings of all cultivars. These contributed positively to propagation via cuttings.