Rooting Procedures for *Alstroemeria* Divisions and Micropropagated Cuttings

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INTRODUCTION

The breeding of *Alstroemeria* has been ongoing at the University of Connecticut since 1985. Four cultivars of the *Constitution Series* were patented and introduced in 1994: 'Freedom[P]', 'Liberty[P]', 'Patriot[P]', and 'Redcoat[P]'. These *Alstroemeria* can be propagated asexually by the division of rhizomes or through micropropagation. As a result of a Goodyear grant from the state of Connecticut, we are conducting research to develop a commercial production protocol for the *Constitution Series*. As part of this research, rooting procedures for both conventional divisions and micropropagated cuttings are being evaluated.

RHIZOME DIVISION

Plants of *Alstroemeria* 'Freedom[P]', 'Liberty[P]', 'Patriot[P]', and 'Redcoat[P]' were divided and randomly planted into 4-in. pots in four rooting media. The media used were Fafard 1-P®, Fafard 2®, Fafard 3® and UConn Mix. Fafard 1-P® is peat moss and perlite (7 : 3, v/v), Fafard 2® is peat moss, perlite, and vermiculite (7 : 2 : 1, by volume), Fafard 3® is peat moss, perlite, vermiculite, and bark (3 : 1.5 : 1.5 : 4, by volume), and the UConn Mix is part soil, part peat moss, and part perlite (1 : 1 : 1, by volume). Plants were divided in August, October, and December of 1994 and placed under greenhouse conditions with 16-h days from 400w HID lights and 55F night temperatures. There were 8 replications per treatment except for 'Liberty[P]' which had 3 replications. Evaluations were made 4 weeks after division.

Table 1. Percent rooting of *Alstroemeria* divisions.

Cultivar	Rooting medium			
	Fafard 1-P®	Fafard 2®	Fafard3®	UConn Mix
Freedom[P]	99 a[a]	96 a	96 a	95 a
Liberty[P]	94 a	75 b	75 b	94 a
Patriot[P]	71 b	74 b	44 c	87 a
Redcoat[P]	95 a	91 a	73 b	98 a

[a] Means followed by the same letter are not significantly different (P<.05).

Significant differences in the percent rooting of divisions were noticed between cultivars and between rooting media (Table 1). 'Freedom[P]' had excellent rooting in all of the four media; 'Liberty[P]' had the best rooting in the Fafard 1-P and the UConn

[P] = Plant Patent

Mix; 'Patriot^{P}' rooted best in the UConn Mix; and 'Redcoat^{P}' rooted well in the Fafard 1-P, Fafard 2, and the UConn Mix. 'Patriot^{P}' was the most difficult cultivar to root from rhizome division. There were no significant differences in the time of year on rooting.

Although the UConn Mix provided good rooting percentages for all four cultivars, the soilless Fafard 1-P mix or a similar mix of peat moss and perlite is presently being used. The peat and perlite mix provides excellent rooting, is easier to handle, and more economical and lighter for handling and shipping.

ROOTING OF MICROCUTTINGS

The objective of these experiments was to determine if micropropagated *Alstroemeria* needed Stage III root initiation treatment in vitro before acclimation and rooting. From a commercial point of view, it would be ideal to root microcuttings directly from the multiplication stage II. This would eliminate the need for a stage III treatment, which requires additional labor, time and space.

Alstroemeria cultivars from the *Constitution Series* were maintained on a modified Alstroemeria Medium (Bridgen et al., 1991) with 1mg/litre^{-1} benzylaminopurine (BAP). Three in vitro media were used for this experiment: Alstroemeria Medium with BAP, Alstroemeria Medium with no BAP, and Alstroemeria Medium with 5% activated charcoal and no BAP. After 4 weeks on the three in vitro media, the cuttings were stuck in two rooting media in clear polyethylene propagation trays with the lids secured. The rooting media used were vermiculite and sphagnum peat moss mix (1 : 1, v/v) and Pargro™ peatwool. The plants were maintained at 68F with 16-h photoperiod for 4 weeks and then evaluated. There were 10 plants per treatment and six replications.

Significant differences were noted for all treatments (Table 2). The best overall rooting results were obtained by using the Stage III Alstroemeria Medium without BAP pretreatment followed with rooting in Pargro™. The Stage III medium with BAP provided the poorest results in both rooting media. The Pargro peatwool medium provided overall higher rooting percentages than the vermiculite/sphagnum medium.

The results indicate that under these conditions it is necessary to include stage III pre-rooting with auxin before stage IV rooting and acclimation.

Table 2. Percent rooting of *Alstroemeria* microcuttings.[a]

In vitro *Alstroemeria* medium	Rooting medium	
	Vermiculite/sphagnum	Pargro™
(+) BAP[b], (-) activated charcoal	33f	50e
(-) BAP, (-) activated charcoal	57d	80a
(-) BAP, (+) activated charcoal[c]	63c	67b

[a] Means followed by the same letter are not significantly different ($P<.05$).
[b] 1mg liter^{-1} BAP.
[c] 5% Activated charcoal .

LITERATURE CITED

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ADDITIONAL REFERENCES

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The Role of Micropropagation in the Incidence of Tissue Proliferation in *Rhododendron* 'Montego'

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Tissue proliferation (TP) is a condition primarily seen in certain micropropagated rhododendrons. Cultivar Montego was studied because plants grown in containers and in vitro cultures show distinctive morphological and physiological phenotypes which identify plants or cultures which are prone to TP.

Our goal in this study was to test the hypothesis that adventitious events during micropropagation are involved in the induction of TP-like culture characteristics and to test if the cytokinin 2iP plays a role in this induction.

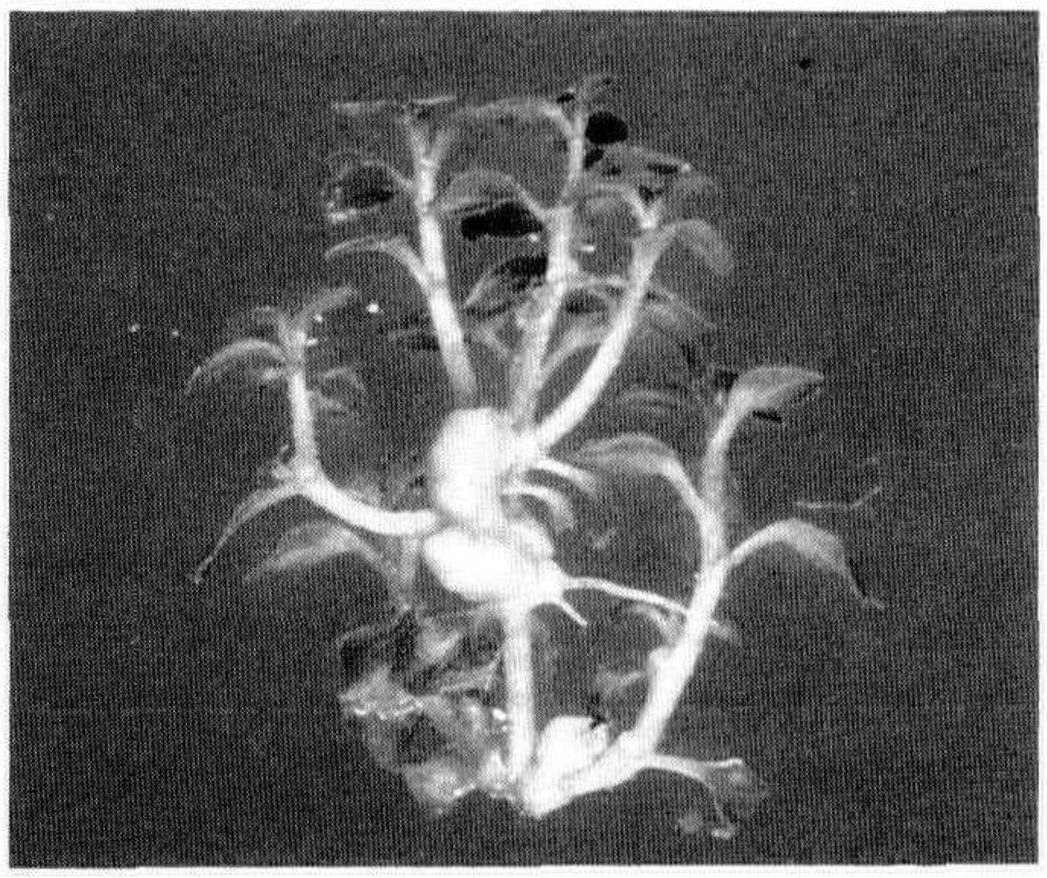

Figure 1. Swellings produced on shoots of a TP+ in vitro culture of *Rhododendron* 'Montego' on basal Woody Plant Medium.

Comparisons were made between 'Montego' with TP (TP+) and 'Montego' control plants that had no TP (TP-) in their propagation history. This was done to avoid the possibility plants or tissues derived from plants with TP may retain the potential to express TP even if TP was not apparent. TP- stock plants were obtained by rooting cuttings from the original 'Montego' plant grown from seed. Cuttings were supplied by Dr. David Leach of the Holden Arboretum. TP+ 'Montego' plants or tissues originated from plants with TP.

Three experiments were conducted. Experiment 1 compared in vitro culture initiation and maintenance char-