

Spin Out™ Enhances Subsequent Growth of Tomato, but not Pepper, Transplants

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Copper products have been used to control root growth of container-grown woody ornamentals for several years. Nursery plants grown in copper-treated containers were observed to establish in the landscape more quickly than traditionally-grown container plants (Arnold and Struve, 1989). More rapid establishment and resumption of growth of transplants would also be of benefit in vegetable and bedding plant production. Therefore, the following preliminary study was undertaken to evaluate the effect of chemical root pruning of tomato or pepper transplants with a cupric hydroxide compound on subsequent root and shoot growth.

'Sunny' tomato (*Lycopersicon esculentum*) and 'Jupiter' pepper (*Capsicum annuum*) seeds were sown in TODD 100A flats left untreated or treated with a latex-based carrier of 7% (100 g/liter) cupric hydroxide (Spin Out™, Griffin Corp., Valdosta, GA). At 33 or 45 days after seeding (DAS) for tomato or pepper, respectively, six plants were randomly selected for growth measurement. Stem length and shoot dry weight were measured. Root systems were divided into basal (including adventitious) roots and tap plus lateral roots. Individual roots were removed and counted from each section and pooled for the dry weight of the section.

The remaining plants were transplanted into 32-oz pots of sand in the greenhouse. Plants were watered daily with 50 ppm N (Peters 20N-20P-20K, Grace-Sierra). At 3, 6, 9, and 12 days after transplanting (DAT), three plants from each treatment were harvested for determination of rate of shoot dry weight gain. At 14 DAT, six plants were harvested for shoot and root growth measurements as described above. All data were subjected to analysis of variance using SAS GLM and regression models. The natural logarithm of shoot dry weight was plotted against time after transplanting.

Results and Discussion: Neither stem length nor shoot dry weight of 33-day-old tomato plants was affected by the Spin Out™ treatment (data not presented). Total root numbers were not affected by Spin Out™ but initial root dry weight of 33-day-old tomato plants was reduced 30% by the treatment (Table 1). Two weeks after transplanting to sand-culture in the greenhouse, total root dry weight of treated transplants was 4% greater than that of untreated tomato transplants. The rate of shoot dry weight gain of treated transplants (0.134 mg/day) over 12 days of sand culture was slightly greater than that of untreated transplants (0.122 mg/day, $P < 0.05$).

However, roots of 45-day-old pepper transplants were slower to recover from the copper damage. Initial root dry weight of treated plants was reduced 32% relative to controls (Table 1). After two weeks of sand culture, root dry weight of treated plants was still 22% less than controls. Shoot growth of pepper transplants was unaffected. Root development inside the plug was particularly lacking indicating reductions in lateral root branching. Preliminary studies indicate that treatment of flats with Spin Out™ enhances the subsequent growth of tomato, but not that of pepper transplants. Growth response of treated transplants under stress conditions and actual field conditions must be examined before recommending its use in vegetable production. Preliminary results with other Spin Out™ treatment concentrations suggest improvements in pepper transplant growth can also be achieved with flat treatments.


Further work with Spin Out™ will provide growers with the ability to control root growth and development of herbaceous plants in order to enhance subsequent performance under field conditions.

Literature Cited

1. Arnold, M.A. and D.K. Struve. 1989. Growing green ash and red oak in CuCO_3 -treated containers increases root regeneration and shoot growth following transplant. *J. Amer. Soc. Hort. Sci.* 114:402-406.

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Table 1. Root growth measurements of 'Sunny' tomato or 'Jupiter' pepper transplants grown in TODD 100A flats left untreated or treated with 7% Spin Out™. Day 0 measurements were made 33 or 45 days after seeding, for tomato or pepper, respectively, at which time plants were transplanted to pots of sand and subsequent growth was measured 14 days later (Day 14).

Treatment	<u>Tap + lateral roots</u>		<u>Basal roots</u>		Total number of roots	Total root dry wt (mg)
	Number	Dry wt (mg)	Number	Dry wt (mg)		
<u>Tomato</u>						
Day 0						
Untreated	27	7.9	20	10.3	48	18.2
Spin Out™	24	5.4	25	7.2	50	12.6
Main effect	NS	**	NS	NS	NS	**
Day 14						
Untreated	39	91	36	140	76	231
Spin Out™	37	105	41	135	78	240
Main effect	NS	*	*	NS	NS	NS
<u>Pepper</u>						
Day 0						
Untreated	24	9.2	31	12.6	55	21.8
Spin Out™	21	6.5	34	8.3	54	14.9
Main effect	NS	*	NS	*	NS	*
Day 14						
Untreated	37	30.9	54	93	91	124
Spin Out™	34	26.0	54	70	88	96
Main effect	NS	NS	NS	NS	NS	*

NS, *, ** Not significant or significant at P < 0.05 or 0.01, respectively.