

Use of ABA (Abscisic Acid) and PEG 8000 (Polyethylene Glycol) to Control Vegetable Transplant Height -2006

Mark Bennett, Elaine Grassbaugh, and Matt Hofelich
Ohio State University
Columbus, OH

Introduction: Vegetable transplants can become tall and leggy prior to field establishment, producing challenges for growers using mechanical transplanters to establish their crops. Preliminary greenhouse research in 2005 showed that the use of ABA reduced tomato transplant heights by as much as 67% compared to untreated control plants.

Materials and Methods: Plug trays were seeded on April 18 with 'BHN 685' plum tomatoes (288-cell plug trays) and 'Wahoo' bell peppers (200-cell plug trays). ABA (abscisic acid) was applied as a foliar application on June 1 at a rate of 100, 200 or 400 ppm five days before transplanting and PEG 8000 (polyethylene glycol) was incorporated into the growing mix (Metro-Mix) at the rate of 20g/liter of mix prior to seeding plug trays to control transplant height in vegetable transplants. Plots were mechanically transplanted on June 6 into raised beds spaced 5 feet apart with in-row plant spacing of 12 inches. Treatments were evaluated for their effect on transplant height control, field establishment, crop growth, and final marketable yield. Tomato plant height and stem diameter measurements were recorded prior to ABA application and 5 days after application (plant height only). Plant height, stem diameter, percent survival and dry weights were recorded 3 weeks after transplanting. The same measurements plus plant height 7 weeks after transplant were recorded on peppers. Tomatoes were harvested on September 26 and peppers were harvested on August 14, 29 and September 12.

Results: PEG incorporated into the growing mix prior to seeding significantly reduced plant height in both tomatoes and peppers prior to transplanting. ABA applied at the rates of 100, 200 and 400 ppm significantly reduced tomato transplant height 5 days after application (DAP) compared to untreated control plants while 100 and 200 ppm rates reduced pepper transplant heights at 5 DAP (Tables 1, 2). No differences in height were seen in either the tomatoes or peppers 3 weeks after transplanting, but there were differences in stem diameter in tomatoes (Table 1). There were no differences in final marketable yield in either crop. The use of ABA and PEG helped control transplant height prior to transplanting without adverse effects on final yield in both tomatoes and peppers.

Acknowledgements:

- Special thanks to the *Ohio Vegetable and Small Fruit Research and Development Program* and the *OARDC Small Industry Grant Program* for their financial support of this research.
- Thanks to *Seedway* for their seed donations for this project.

Table 1. Use of ABA and PEG 8000 to Control Fresh Market Vegetable Transplant Height - 2006

TOMATOES 'BHN685'

Prior to ABA Application:

Treatment	Plant ht. (cm)	Stem diam (mm)
Untreated	12.9	3.0
PEG	9.1	2.7
LSD	1.59	NS
CV	20.0	7.1

Treatment	---5 days after ABA application---	-----3 wks after transplanting-----			
	(at transplant) Plant ht. (cm)	Percent survival	Plant ht. (cm)	Stem diam. (mm)	Dry wt of 5 plants (gm)
Control	16.1	98	23.6	6.5	14.1
ABA 100 ppm	12.6	98	21.1	6.6	14.9
ABA 200 ppm	13.2	98	21.2	5.6	8.6
ABA 400 ppm	12.6	96	18.2	5.6	9.4
PEG	11.2	99	22.8	6.6	14.7
LSD	1.32	NS	NS	0.78	NS
CV	13.8	3.1	15.8	11.5	44.5

Treatment	Red T/A	Green T/A	Cull T/A	Percent red fruit	Avg. fruit wt. (lbs)
Control	7.6	10.2	6.3	32	0.27
ABA 100 ppm	9.3	13.2	10.7	28	0.32
ABA 200 ppm	13.1	15.6	6.8	35	0.29
ABA 400 ppm	9.1	10.9	7.8	31	0.35
PEG	8.8	11.6	10.7	31	0.32
LSD	NS	NS	NS	NS	NS
CV	61.8	40.3	72.3	25.0	31.2

Table 2. Use of ABA and PEG 8000 to Control Fresh Market Vegetable Transplant Height - 2006

PEPPERS 'Wahoo'

Prior to ABA Application:

Treatment	Plant ht. (cm)	Stem diam (mm)
Untreated	11.7	3.0
PEG	8.7	2.6
LSD	2.24	NS
CV	24.5	10.0

Treatment	---5 days after ABA application---		-----3 wks after transplanting-----		7 wks after transplanting	
	Plant ht. (cm) (at transplant)	Plant ht. (cm)	Percent survival	Stem diam. (mm)	Dry wt of 5 plants (gm)	Plant ht. (cm)
Control	13.8	15.0	94	5.1	5.1	27.5
ABA 100 ppm	12.0	13.2	97	5.2	5.0	29.1
ABA 200 ppm	11.4	14.5	99	4.2	4.0	26.2
ABA 400 ppm	12.5	13.6	93	4.6	3.8	26.2
PEG	9.7	11.4	98	5.4	4.9	25.8
LSD	1.47	NS	NS	NS	NS	NS
CV	12.2	18.1	4.6	17.9	38.8	7.6

Treatment	Avg. fruit wt. (lbs)	
	Red T/A	Cull T/A
Control	4.4	2.1
ABA 100 ppm	4.4	2.3
ABA 200 ppm	4.9	2.0
ABA 400 ppm	3.7	2.2
PEG	4.1	2.1
LSD	NS	NS
CV	18.8	31.5
		9.0