

# Ornamental Section

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## IMPATIENS HEIGHT CONTROL BY PACLOBUTRAZOL FOR PLANTS GROWN IN MEDIA CONTAINING COMPOST<sup>1</sup>

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**Abstract.** Commercial greenhouse operators have the opportunity to utilize compost products made from urban waste as a component of their growing media. However, heterogeneity among many compost products has the potential to influence activity of ancymidol, paclobutrazol, and uniconazole when applied as a drench to the growing medium. The purpose of this project was to evaluate the effect of 0, 30, 60, or 100% composted biosolids/yard trimmings in the medium on the efficacy of paclobutrazol applied as a drench on *Impatiens wallerana* Hook. 'Accent Red'. Sixteen days after transplanting, paclobutrazol was applied at active ingredient drench rates of 0, 0.016, 0.032, 0.06, or 0.125 mg·pot<sup>-1</sup>. Final impatiens plant height and shoot dry mass were reduced by paclobutrazol treatments compared to untreated plants. Final plant height, shoot dry mass and size also were significantly different among the media with greatest growth in 100% compost. There were no significant interactions between paclobutrazol concentration and percentage of compost in the medium. Chemical name used:  $\beta$ -[(4-chloro-phenyl)methyl]- $\alpha$ -(1,1-dimethylethyl)-1H-1,2,4-triazole-1-ethanol (paclobutrazol).

Selection of medium components is an important aspect of bedding plant production. Commercial greenhouse operators have the opportunity to use compost products made from urban waste materials as a bedding plant medium component. For example, marigold, zinnina, and petunia growth were greater in a sludge compost and/or a sludge compost-vermiculite medium than a sand-peat medium (Wootton et al., 1981).

Because a wide variety of substrates are used in making composts, researchers must investigate all areas of bedding plant production to successfully utilize compost products as bedding plant media components. Research has shown that pine bark in the medium can decrease the effectiveness of ancymidol, paclobutrazol, and uniconazole when applied as a medium drench (Barrett, 1992). Moreover, Barrett (1982) reported that 'Bright Golden Anne' chrysanthemum plants were

shorter in medium without pine bark than plants in medium with pine bark after ancymidol drench. No work has been published on the use of paclobutrazol as a drench in media containing compost products. The purpose of this experiment was to evaluate the effect on 0, 30, 60, or 100% composted biosolids/yard trimmings on the efficacy of paclobutrazol applied as a drench on *Impatiens wallerana* 'Accent Red'.

### Materials and Methods

Plugs of impatiens 'Accent Red' (Lovell Farms, Miami) were planted into 10.2 cm diameter plastic pots filled with (by volume): 1) 100% compost as a stand alone medium; 2) 60% compost: 25% vermiculite: 15% perlite; 3) 30% compost: 30% sphagnum peat: 25% vermiculite: 15% perlite; or 4) 60% sphagnum peat: 25% vermiculite: 15% perlite. The compost product was made from a 1:1 by weight mixture of biosolids (a.k.a. sewage sludge) and yard trimmings and was obtained from the Solid Waste Authority of Palm Beach County, Palm Beach, Fla. The compost was made using a rectangular agitated beds system. Materials were mixed and composted for approximately 21 days. Finished compost products were stockpiled for approximately 2 months prior to use in this project. The product did not contain any significant amounts of inert substances (plastic, glass, etc.) that would prevent it from being handled without protective measures.

Six days after transplanting, all pots were top-dressed with 2.5 g of 14N-6.2P-11.6 K Osmocote® (Sierra Chemical Company, Milpitas, Calif.). Plants were watered twice daily at 8:15 AM and 1:15 PM. Sixteen days after transplanting, paclobutrazol was applied at active ingredient drench rates of 0, 0.016, 0.032, 0.06, or 0.125 mg·pot<sup>-1</sup>. Volume of drenches was 60 ml·pot<sup>-1</sup>.

Plant height was measured at the time of paclobutrazol application. Thirteen days after application, final plant height and plant size were recorded, and shoots were harvested, dried at 93C for 48 hr, and weighed. Plant height was measured from the surface of the growth medium to the meristem of plant and plant size was calculated as the average of final plant height and plant width.

The experiment was conducted in May 1996 in a shade-house (30% light exclusion) exposed to ambient conditions at the University of Florida, Fort Lauderdale Research and Education Center, Fort Lauderdale, Fla. Pots were arranged in completely randomized design with five replicates per paclobutrazol and media combination. All values were analyzed using analysis of variance procedures (SAS, 1987).

### Results and Discussion

Impatiens height measured at time of application was different among the media but was not different among the five

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Table 1. Analysis of variance of the effects of paclobutrazol applied at active ingredient drench rates of 0, 0.016, 0.032, 0.06, or 0.125 mg·pot<sup>-1</sup> on 'Accent Red' impatiens initial height, final height, shoot dry mass, and final plant size for plants grown in media with 0, 30, 60, or 100% compost in the medium.

Source	df	Initial height		Final height		Shoot dry mass		Final size	
		MSE	P>F	MSE	P>F	MSE	P>F	MSE	P>F
Replicate	4	0.32	0.5062	0.74	0.7856	0.11	0.4262	1.83	0.7648
Percentage of compost	3	3.27	0.0001	6.15	0.0177	1.12	0.0001	73.2	0.0001
Paclobutrazol rate	4	0.31	0.5295	5.60	0.0161	0.53	0.0018	6.95	0.1476
Percentage*Rate	12	0.61	0.1179	0.74	0.9465	0.09	0.6175	4.30	0.3862
Error	76	0.39		1.72		0.11		3.97	

Table 2. Final height, shoot dry mass, and plant size of impatiens 'Accent Red' plants grown in 0, 30, 60, or 100% compost and drenched with paclobutrazol at active ingredient rates of 0, 0.016, 0.032, 0.06, or 0.125 mg·pot<sup>-1</sup>.

Paclobutrazol active ingredient rate (mg·pot <sup>-1</sup> )	Percentage of compost in the medium			
	0%	30%	60%	100%
<i>Final height (cm) LSD = 1.64</i>				
0	8.24	8.14	8.42	9.22
0.016	7.18	7.36	7.30	8.62
0.032	7.04	6.88	7.70	7.90
0.060	6.22	7.74	6.80	7.66
0.125	7.78	7.30	7.48	8.64
<i>Shoot dry mass (g) LSD = 0.42</i>				
0	1.21	1.22	1.18	1.51
0.016	0.91	0.77	1.02	1.39
0.032	0.92	0.68	0.88	1.19
0.060	0.89	1.11	0.67	1.20
0.125	0.82	0.61	0.69	1.32
<i>Final plant size (cm) LSD = 2.49</i>				
0	11.12	12.37	13.81	13.51
0.016	8.79	12.35	13.15	13.86
0.032	9.77	11.74	11.45	14.23
0.060	8.76	12.57	10.60	12.63
0.125	8.94	10.45	13.24	13.37

paclobutrazol concentrations (Table 1). Height, averaged over all paclobutrazol rates, was 6.5, 6.0, 5.9, and 6.7 cm for 0, 30, 60, and 100% compost in the medium, respectively. Heights of plants in 0 and 100% compost were similar but were different from heights of plants in 30 and 60% compost.

Final impatiens plant height and shoot dry mass were reduced by paclobutrazol treatment compared to untreated plants, but plant size was not significantly reduced by paclobutrazol treatment (Tables 1 & 2). Final height was, on average, 1.0 cm shorter in treated pots than untreated pots for all media, while shoot dry mass was, on average, 0.34 g less in treated pots than untreated pots. Final height, shoot dry mass and plant size also were different among the media (Table 1). Both final impatiens height and plant size increased as percentage of compost in the medium increased from 0 to 100%

(Table 2). Final height, averaged over all paclobutrazol rates, increased from 7.3 cm in 0% compost to 8.4 cm in 100% compost, while plant size increased from 9.5 cm in 0% compost to 13.5 cm in 100% compost. However, shoot dry mass, averaged over all paclobutrazol rates, was greatest at 100% compost with an average mass of 0.91 g (Table 2). There were no significant interactions between paclobutrazol concentration and percentage of compost in the medium for any of the parameters measured.

The inclusion of composted biosolids/yard trimmings in the medium did reduce the effectiveness of paclobutrazol for controlling growth of impatiens 'Accent Red'. This was expected considering that 70% (by volume) of the compost used contained yard trimmings that included some pieces of bark and branches. Tschabold et al. (1975) concluded that pine bark in the medium did not affect ancymidol biological activity, but influenced its distribution in the medium. Because paclobutrazol is less soluble in water than other growth regulators, its placement in the root zone can affect its availability (Barrett, 1982). Barrett (1982) reported that the hydrophobic attraction between nonpolar portions of the growth retardant and bark resulted in the adsorption of ancymidol to the bark. Media components composed of fewer hydrophobic substances have less effect on the activity of ancymidol and paclobutrazol (Barrett, 1982). Therefore, drench applications of paclobutrazol to media containing compost made with yard trimmings may produce less than expected growth responses.

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