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Improving Quality of Containerized Herbaceous Perennials with a Tank Mix of Configure and Piccolo

by Joyce Latimer and John Freeborn

Sometimes growers need to improve the branching of their containerized perennials but really need some growth regulation as well, especially as the spring season starts to warm up or as they pot up summer perennials for bulking before overwintering. Tank mixing may be a good solution.

Note: This research report is an expansion of the April 2015 e-GRO Alert, 4.27. We wanted to show you the actual data from these studies. Sometimes it just helps to see the numbers!

Many tank mixes are designed to provide a synergistic effect, such as daminozide and chlormequat chloride (CCC), where the products are more efficacious together than the sum of the response to the products applied individually (Banko et al., 2001; Bruner et al., 2001). Typically synergism allows you to use lower rates of both products to get the same or greater efficacy. Other reports challenge the synergy concept with findings of less response to a tank mix like daminozide plus CCC where the crops, *Rudbeckia* 'Goldstrum' and *Coreopsis verticillata* 'Moonbeam,' were only responsive to the daminozide (Amling et al., 2005). Adding CCC or using CCC alone actually produced less height control for these crops.

Our goal was evaluate herbaceous perennials for a possible synergistic response to a branching agent, Configure (benzyladenine, Fine Americas, Inc., Walnut Creek, CA), tank mixed with an anti-gibberellin growth retardant, Piccolo (paclobutrazol, Fine Americas, Inc.).

Summary of Findings

1. A tank mix of Configure and Piccolo did not result in a synergistic effect on growth and architecture of the crops tested, but the crops were responsive to one or both PGRs.
2. Furthermore, presence of the second PGR did not affect the efficacy of the first PGR.
3. Therefore, select your Configure rate and your growth retardant rate based on the needs of the crop and your own experience.
4. Then combine the Configure and growth retardant in a single tank mix application to improve the quality and growth regulation of your containerized herbaceous perennials.

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What we did

We evaluated three crops, *Echinacea purpurea* 'Doubledecker,' *Heuchera* 'Silver Lode,' and *Leucanthemum superbum* 'Becky,' grown from commercial plugs, size 72 cell, in summer 2008. Plugs were potted into quart pots (*Echinacea* and *Heuchera*) filled with a soilless substrate (Fafard 3B, Sun Gro Horticulture, Agawam, MA) or trade gallon pots (*Leucanthemum*) filled with a coarser soilless substrate (Fafard 52, Sun Gro). Plants were irrigated to prevent drought stress using a constant liquid feed of 200 ppm N (Peter's 20-10-20, Scotts Fertilizer, Marion, OH).

At about 10 days after potting, plants were sorted for uniformity and PGRs were applied as foliar sprays at the label recommended volume of one gallon per 200 square feet. PGRs applications were 600 ppm Configure, 120 ppm Piccolo, or a tank mix of 600 ppm Configure plus 120 ppm Piccolo. All applications were compared to an untreated control. Plants were evaluated for height, width and number of basal branches over the production period. Only the *Echinacea* flowered during the trial. Each crop was set up as an individual experiment with plants arranged in a completely randomized design with 10 single plant replications.

What we found

Echinacea.

Plant height of *Echinacea* 'Doubledecker' was reduced by all PGR applications at 2 weeks after treatment (WAT) but only those PGR applications including 120 ppm Piccolo resulted in shorter plants at 4 WAT (Table 1; Figure 1). Thereafter, the persistent 40% reduction in the vegetative plant height of Piccolo-treated plants was not statistically significant, which suggests variability in our plant growth. Plant width was only mildly affected, significantly reduced by all treatments at 2 WAT but only by the Piccolo only treatment at 4 WAT (data not presented).

Only the PGR applications including Configure increased the number of basal branches of *Echinacea* (Table 1). This increase of over 100% in the number of branches persisted through the 12 week study but did not translate into a significant increase in the number of flowers per plant. Numbers of flowers per pot at 12 WAT: Control 6.7 vs. Configure 9.9 vs. Piccolo 5.3 vs. Configure + Piccolo 6.4. Flowering was delayed (less than one week) with this rate of Piccolo but flower height was not reduced by either Piccolo application.

Table 1. Plant height and number of basal branches of *Echinacea* 'Doubledecker' untreated or treated with 600 ppm Configure, 120 ppm Piccolo, or a tank mix of 600 ppm Configure plus 120 ppm Piccolo as measured at 2, 4, 6 or 12 weeks after treatment (WAT).

	2 WAT		4 WAT		6WAT		12 WAT	
PGR application	Plant Ht (cm)	No. of branches	Plant Ht (cm)	No. of branches	Plant Ht (cm)	No. of branches	Plant Ht (cm)	No. of branches
Untreated	11.7a	1.5b	15.5a	1.9b	24.9	1.8b	29.7	2.5b
Configure 600 ppm	9.1b	3.8a	13.7ab	4.4a	20.3	5.6a	25.2	6.4a
Piccolo 120 ppm	7.7cb	1.7b	10.8bc	1.8b	13.8	1.8b	17.3	2.4b
Configure 600 ppm + Piccolo 120ppm	6.4c	3.2a	10.4c	4.6a	14.3	5.5a	17.8	6.8a
Rate effect	<.0001	<.0001	0.0072	<.0001	0.0647	<.0001	0.2244	<.0001
LSD	2.0915	0.8524	3.2226	0.8723	9.3316	1.2475	13.948	1.5334

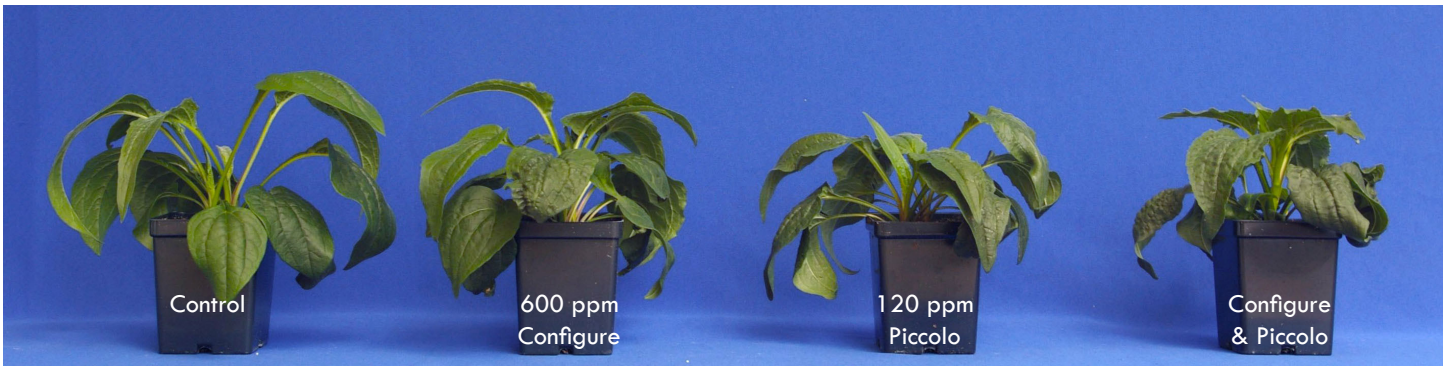

Figure 1. *Echinacea* 'Doubledecker' untreated or treated with 600 ppm Configure, 120 ppm Piccolo or a tank mix of Configure and Piccolo at those same rates (left to right). Photo at four weeks after application.

Heuchera.

Neither plant height nor width of *Heuchera* 'Silver Lode' were affected by Configure or Piccolo relative to the control plants (data not presented). Because of the compactness of the crown, it was very difficult to get an accurate count of branches on *Heuchera*. So, we conducted a destructive harvest to get the 4 and 6 WAT basal branch counts using half of the total number of plants for each harvest (n=5). We found that the number of basal branches was increased by either Configure or the Configure + Piccolo application at 4 WAT but this increase was no longer significant at 6 WAT (Table 2). However, the density of the plant was increased which improved pot fill (Figure 2).

Table 2. Number of basal branches on *Heuchera* 'Silver Lode' untreated or treated with 600 ppm Configure, 120 ppm Piccolo, or a tank mix of 600 ppm Configure plus 120 ppm Piccolo as measured at 0, 4, or 6 weeks after treatment (WAT).

	Number of branches		
PGR application	0WAT	4WAT*	6WAT*
Untreated	2.0	13.2b	15.2
Configure 600 ppm	1.9	23.0a	22.2
Piccolo 120 ppm	2.0	12.4b	16.6
Configure 600 ppm + Piccolo 120ppm	2.0	27.6a	21.6
Rate effect	0.9588	0.0022	0.3565
LSD	0.451	8.1223	9.8067

*Due to destructive harvest at 4WAT, n=5.

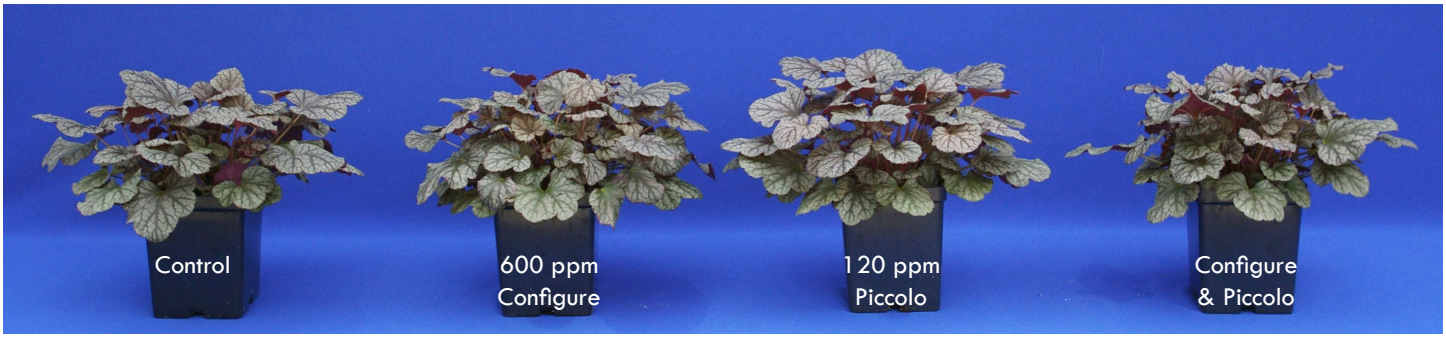

Figure 2. *Heuchera* 'Silver Lode' untreated or treated with 600 ppm Configure, 120 ppm Piccolo or a tank mix of Configure and Piccolo at those same rates (left to right). Photo at four weeks after application.

Leucanthemum.

Plant height of *Leucanthemum* 'Becky' was reduced by all treatments at 2 WAT but the differences were not significant at or beyond 4 WAT (data not presented). Plant width was reduced moderately, but significantly, by Configure + Piccolo tank mix at 4 WAT, and by both treatments containing Piccolo at 6 WAT (Table 3). Both treatments containing Configure increased the number of basal branches of *Leucanthemum* at 2 WAT. These results persisted for the Configure treatment at 4 WAT. These plants did not flower during the test. (Figure 3).

Table 3. Plant width and number of basal branches on *Leucanthemum* 'Becky' untreated or treated with 600 ppm Configure, 120 ppm Piccolo, or a tank mix of 600 ppm Configure plus 120 ppm Piccolo as measured at 2, 4, or 6 weeks after treatment (WAT).

	2 WAT		4 WAT		6WAT	
PGR application	Plant Ht (cm)	No. of branches	Plant Ht (cm)	No. of branches	Plant Ht (cm)	No. of branches
Untreated	28.5	7.4b	31.7a	11.4b	41.5a	18.0
Configure 600 ppm	29.3	10.6a	29.8ab	13.7a	40.6a	16.2
Piccolo 120 ppm	29.4	6.7b	31.2a	11.3b	37.8b	18.0
Configure 600 ppm + Piccolo 120ppm	29.2	9.7a	27.9b	12.4ab	37.0b	17.4
Rate effect	0.8233	<.0001	0.0018	0.0303	0.0021	0.8484
LSD	2.111	1.5926	1.9782	1.7564	2.5253	4.9262

*Due to destructive harvest at 6 WAT, n = 5.

Figure 3. *Leucanthemum* 'Becky' untreated or treated with 600 ppm Configure, 120 ppm Piccolo or a tank mix of Configure and Piccolo at those same rates (left to right). Photo at four weeks after application.

Recommendations

Configure and Piccolo work well to improve plant branching as well as to maintain control of plant growth on responsive crops. Our results do not support any suggestion of synergism in the effects of these products combined in a tank mix.

In other studies, we found similar results with tank mixes of Configure plus Concise (uniconazole, Fine Americas) or with Configure plus Dazide (daminozide, Fine Americas). Therefore, select your Configure rate and your growth retardant rate based on the needs of the crop and your own experience. Then combine them in a single application to improve the quality and growth regulation of your containerized herbaceous perennials.

Acknowledgements

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