

Specticle G for Landscape Ornamental Bed Use Compared to Snapshot and FreeHand

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Background. The sponsor Bayer Environmental Science requested a landscape bed trial to compare Specticle G (indaziflam) (Bayer CropScience, Research Triangle Park, NC 27709) a 0.2224% granular formulations to FreeHand (dimethenamid-p + pendimethalin, BASF Corporation, Research Triangle Park, NC 27709) applied at (normal rate) 150 lb./ ac and Snapshot 2.5 TG (isoxaben + trifluralin) (Dow AgroSciences, LLC, Indianapolis, IN 46268) applied at (normal rate) 150 lb./ac. The Specticle G was applied at three rates 100lb./ ac, 150lb./ ac and 200 lb./ ac. All three products are labeled for landscape use. The sponsor preferred that the trial beds be located adjacent to turf so as to observe any growth and quality impacts the products had on the turf. The sponsor also requested that we note whether mulch was present on the beds at time of application.

Material and Methods. We established 5 X 6 ft. plots /treatment /subsample/ replication that were mulched with pine nuggets at 2" deep and 5X 6 ft. or un-mulched plots/ treatment/ subsample/ replication. This was done to increase the sponsor's knowledge regarding the influence of mulch on the efficacy of these various herbicides and rates. Mulch is commonly used in landscape beds throughout the US. The plots were established on May 30 at Waterman Farm, Columbus, OH and one inch of rain fell on June 2, 2013. Supplemental irrigation was provided in the first two weeks during establishment; however, all irrigation was discontinued after two weeks and only normal precipitation was provided. June and July were wetter than normal months in Columbus, OH with increases of 1.39 inches in June and 2.08 inches in July over the 30 year average. August was 0.62 inches and September 1.36 inches drier than the 30 year average. The herbicides were applied on June 7, 2013. To observe phytotoxicity one shrub, white spruce (*Picea glauca*, grown at OSU, Columbus, OH) (1 foot tall) (from one gallon containers), one tree, Freeman Maple (*Acer Xfreemanii*, J. Frank Schmidt Nursery, Boring, OR) (10 ft. tall) and one annual (Petunia) (4" tall) (from 4" plug trays) were used in each plot. The maples were established in four rows that were planted in 2011 at a spacing of 6 ft. in the row and 12 ft. between the rows. After the maples were planted in 2011, sod cover was established up to 2ft on either side of the tree row, as a mixture of tall fescue (*Festuca arundinacea*) cultivars of 'Labarinth', 'Five Point', and 'Falcon IV' seeded April, 2011. Bare soil cultivation was performed in 4 ft. swaths in the rows once per month in 2011 and 2012. 84 petunias and 84 spruce were planted on May 30, 2013 and 21 maples per row for a total of 84 were used.

For efficacy natural weed pressure was used which is quite severe at OSU, Waterman Farm. Efficacy and phytotoxicity were evaluated in the same plot / subsample/ rep/ treatment. One foot grass walkways were established between each 5 X 6 ft. plot within the rows and therefore, we employed two controls, one weeded at each evaluation date and one un-weeded. Each replication was composed of two subsamples. So that each replication/

treatment was actually 12 ft. in length within the row (Fig. 1). Two mulches (pine and no) X 7 treatments X 2 subsamples X 3 replications (as specified by the sponsor) were arranged in a completely randomized design of 42 plots of two subsamples per plot for 84 plants per species. Phytotoxicity evaluations consisted of visual ratings based on a 0-10 scale with 0 being no phytotoxicity, 10 death and ≤ 3 commercially acceptable. Efficacy evaluations also consisted of visual ratings based on a 0-10 scale with 0 being no control, 10 perfect weed control and $7 \geq$ commercially acceptable. Evaluations were conducted at 1 MAT (month after treatment), 2 MAT and 3 MAT. Data was analyzed using SAS® Proc GLM. Treatments were compared to each other using least significance difference (ls means).

All herbicides were applied at the rates specified above using handheld shaker jars, over-the-top of smaller plants (Spruce and petunia) and over the top of mulched plots. The herbicides were allowed to set on the foliage for one day and then were watered in with at least 0.5" water using overhead irrigation. Osmocote Pro 17-5-11 fertilizer was applied after the plots were established as a top-dress of 3 lb./ 1000 sq. ft.



Fig. 1. Bayer landscape trial at OSU, Waterman Farm with 21 trees in four rows. Plots consist of two subsamples each 5 ft. X 6 ft. Running contiguously down within the rows as 5 ft. X 12 ft. plots per treatment per replication with 12 feet between rows of Freeman maple and 6 feet between trees in the rows. White spruce is planted along the left edge of each plot. Picture taken 7 WAT.

Results and discussion. *Phytotoxicity.* There was no phytotoxicity observed with the white spruce or the Freeman maples used in this trial with any treatment, with or without mulch (data not shown). Unfortunately the Petunias did not survive to the evaluation at 1MAT. Even though there was more rainfall than normal in the Columbus area during June and July 2013 some of the petunias were planted into the mulch and quickly succumbed. Petunias are generally known to non-heat tolerant and on May 30 during planting temperatures did reach 89 °F. The first week after planting the maximum daily temperatures were below normal, but during the second and third week of June daily highs were reaching the high 80s and 90°F. The death of the petunias was not due to a treatment effect.

Turf. Tall Fescue is generally considered tolerant of most preemergence herbicides and our results concur. We found no effect of any treatment on the surrounding turf. Even though rain events of over 1" occurred 3 and 6 days following treatment there was no signs of herbicide leaching into surrounding plots.

Efficacy. The efficacy of all herbicide treatments significantly increased when applied on top of 2 inches of pine mulch (Table 1) (Fig. 2).



Fig. 2. Three plots at OSU Waterman Farm, July 27, 2013 (7 WAT) showing the mulch is having a significant effect on increasing efficacy. In the foreground is a mulched plot, middle is an un-mulched plot and background is a mulched plot.

The greatest difference in efficacy occurred between mulched and un-mulched plots of Specticle 100 lb./ ac rate at each month of evaluation (Table 1) including 3 MAT (Fig. 3). No non-mulched plots provided commercially acceptable weed control (rating of 7 or higher) at 1 MAT. The Freehand and the Specticle G 200 lb./ ac rate were statistically similar at 1 MAT and were performing the best at near commercially acceptable levels. The Specticle 100 lb./ ac rate was statistically similar to the weedy control, without mulch, at 1 MAT. However, with the mulch the Specticle 150 lb. and 200 lb. plus the Snapshot and FreeHand were all commercially acceptable at 1 MAT and not statistically different from one another.

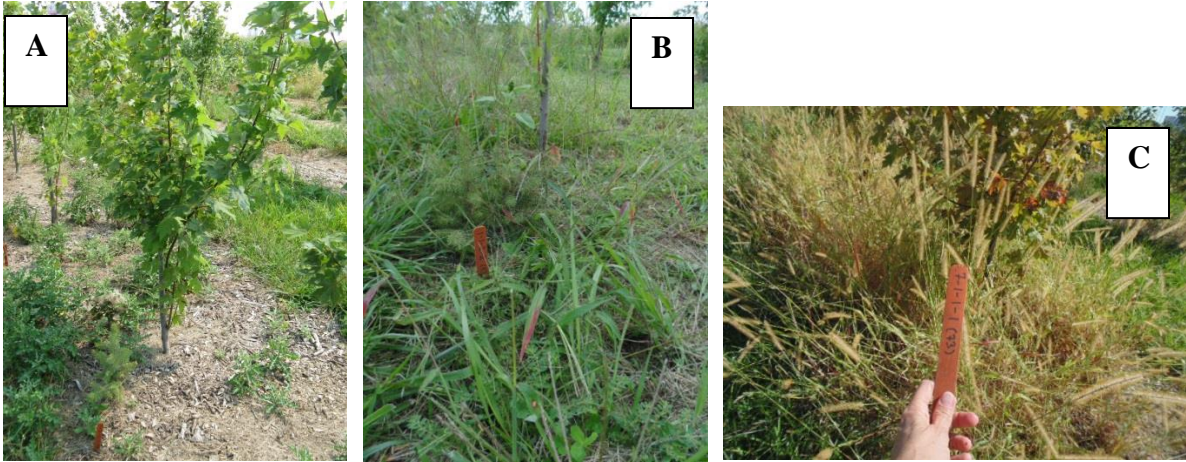


Fig. 3. A, B and C. Bayer landscape trial photos taken at Waterman Farm, Columbus, OH showing **A.** Specticle 100 lb./ac with mulch, **B.** Specticle 100 lb./ac un-mulched and **C.** the Control at 3 MAT. Showing the significantly poorer control provided in the un-mulched Specticle 100 lb./ ac (**B**) versus the mulched plot (**A**).

At 2 MAT the mulched and un-mulched plots of the Specticle 150 lb. and 200 lb. plus the Snapshot and FreeHand provided nearly unchanged weed control ratings versus 1 MAT and again were not statistically different from one another (Table 1). All four of these treatments were still providing commercially acceptable weed control at 2 MAT.

At 3 MAT the Specticle 150, 200 and FreeHand treatments had lost efficacy applied to un-mulched plots (Table 1). However, only the Specticle 150 lb./ac had lost efficacy in the mulched plots (Table 1) and was now below commercially acceptable at 3 MAT. The Specticle 150 lb./ ac was also statistically weaker in its weed control versus the Snapshot and the FreeHand (Table 1). Only the Specticle 200 lb./ac was still statistically similar to these two herbicides which were not statistically different from one other (Table 1) (Fig. 4 A, B and C).



Fig. 4 A, B and C. **A.** FreeHand with mulch, **B.** Snapshot and mulch and **C.** the Weedy Check with no mulch at 3MAT. Both FreeHand and Snapshot at 3 MAT are providing commercially

acceptable weed control and the Snapshot treatment (**B**) is also showing some Canada thistle suppression (encroaching from one foot buffer - bottom of the photo). **C**. The weedy check with no mulch indicates the weed pressure on the site was severe.

In summary, Snapshot is the most commonly used preemergence herbicide in the landscape industry. FreeHand is taking some of the landscape market that Snapshot dominates; however, FreeHand offers no alternative to Snapshot in terms of mode of action (MoA) and has similar weed control. The results of this trial concur with previous OSU studies where FreeHand and Snapshot were similar in their landscape weed control. Both FreeHand and Snapshot contain active ingredients that are in the mitosis inhibitor mode of action. Specticle does offer an alternative to Snapshot and FreeHand as it is a new MoA as a cell wall inhibitor. From the results of this trial, the Specticle will need to be used at the 200 lb. rate to match Snapshot in duration of efficacy (Table 1) (Fig. 5 A, B and C).



Fig. 5 A, B and C. A. Specticle 200 lb./ac applied on top of 2" pine nugget mulch (efficacy rating = 0.6), B. Specticle 200 lb./ac un-mulched (efficacy rating 5.8) and C. Weedy Check un-mulched at 3 MAT at Waterman Farm, Columbus, OH (rating 1.0).

Table 1. Weed control of Specticle G at three rates in comparison to Snapshot and Freehand and Untreated plots with and without mulch.

Treatment	Rate/ ac	1 MAT ^z		2 MAT		3 MAT	
		Eff no mulch	Eff w/mulch	Eff no mulch	Eff w/mulch	Eff no mulch	Eff w/mulch
Specticle	100	0.7 ^y d	6.2 bc	1.4 f	6.3 bcde	0.6 e	5.8 cd
Specticle	150	5.0 c	7.0 ab	5.8 cde	7.6 abcd	6.3 bcd	5.9 bcd
Specticle	200	6.3 bc	7.7 ab	6.5 abcde	7.8 abc	5.8 cd	7.8 ab
Snapshot	150	5.2 c	8.5 a	5.8 cde	8.5 a	6.8 abc	8.3 a
FreeHand	150	6.5 bc	8.3 a	6.0 cde	8.2 ab	5.3 cd	8.7 a
Unt.		5.0	7.7	4.8	8.2	4.5	7.8
Weeded	--	c	ab	e	ab	d	ab
Unt.		1.3	6.3	1.3	5.5	1.0	6.0
Weedy	--	d	bc	f	de	e	bcd

z = months after treatment

y = Visual ratings based on a 0-10 scale with 0 being no weed control and 10 perfect control with ≥ 7 commercially acceptable

x = Treatment means followed by the same letter in the same rating date are not significantly different based on lsmeans ($\alpha = 0.05$).