

## Landscape applications of Specticle G compared Specticle Flo and Snapshot TG

**Bayer Protocol #:** HE16USASPW

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Note<sup>1</sup>: This report uses the, *Summary of Herbicide Mechanism of Action (MOA) According to the Herbicide Resistance Action Committee (HRAC) and Weed Science Society of America (WSSA) Classification system* ([wssa.net/wp-content/uploads/HerbicideMOAClassification.pdf](http://wssa.net/wp-content/uploads/HerbicideMOAClassification.pdf)) and specifically the WSSA number classification system ex. microtubule assembly inhibitors as group 3.

Note<sup>2</sup>: All rated score evaluations of phytotoxicity were measured on a 1 to 10 scale, where 1 is significant damage, 6=min. acceptable and 9-10=equal or better than control (Bayer CropScience LP evaluation scale). All rated score evaluations of efficacy were measured on a 0 to 10 scale, where 10 represents complete control and  $\geq 7$  represents commercially acceptable weed control and 0 no control (Barolli et al., 2005; Collins et al. 1999; Duray and Davies, 1989; Mathers and Case, 2010; Samtami et al., 2007). Each interval of efficacy scoring represents a 10% loss of weed control over the test plot ex. 9 would be 10% cover, 7 would be 30%, etc.

**Background.** The goal of this research was to promote Specticle G (indaziflam) (Bayer Crop Science Inc, Research Triangle Park, NC) in the landscape market. The overall objective was to evaluate the utility of Specticle G as an over the top active growth application versus Specticle Flo (indaziflam) (Bayer) and an industry competitor, i.e. Snapshot 2.5 TG (isoxaben + trifluralin) (Dow AgroSciences, LLC, Indianapolis, IN 46268) with five common landscape ornamental plants in seven evaluations from trial initiation to end, 06/27/2016 to 09/13/2016. The experiment had five specific objectives as determined by Bayer CropScience LP: 1) characterize efficacy in the spring for rates tested; 2) compare efficacy to standard 3) compare phytotoxicity and duration to standard; and 4) determine the safety of Specticle Flo as a spring application on active growth.

## **Significance:**

Few rotational products are available for landscape bed maintenance. Eighty-five percent of the industry uses SnapShot 2.5TG repeatedly and without rotation. Snapshot contains isoxaben, a cellulose inhibiting product (Group 21) for broadleaf control and trifluralin, a mitosis inhibitor (Mi) product (Group 3) for grass control. Rotating out of the Mi (Group 3) mode of action (MoA) is extremely difficult in landscape settings due to lack of available products. Specticle, however, offers a rotation away from Mi products as it contains only indaziflam, a cellulose inhibitor (Group 29). Group 29 herbicides inhibit cellulose biosynthesis (Myers et al., 2009), which is a different family than isoxaben (Group 21) although in the same MoA.

## **Materials and Methods:**

The trial was initiated on June 27, 2016 using five mature landscape beds in Gahanna, OH and a complete randomized design (CRD) within species. Treatment and replication location in each species was decided using a random number generator. Liquid applications of Specticle Flo (9 oz/ac) were applied via CO2 backpack sprayer delivering 25 gal/ac (R&D Sprayers, Opelousas, LA 70570) equipped with 8002 vs nozzles (TeeJet, East North Avenue, Carol Stream, IL 60116 ) operated at 45-50 psi with a single nozzle boom. Each granular product was pre-weighed and applied to a 14" diameter treatment plot or circle over-the-top (OTT) of each species/ treatment/ replication. The granular products were the "verge" formulation, 200 lb/ac Specticle G at 150 lb/ac and 200 lb/ac, and the Snapshot 2.5 TG. The 14" diameter treatment plot or circle was also used for the over-the-top (OTT) liquid applications for each species/ treatment/ replication. On the 26<sup>th</sup>, the day before initiation, 1.15 in of rain occurred, thus applications were not made to stressed plants (Table 1). All beds were hand-weeded before applications. Immediately following applications 0.25 in of irrigation was applied and 0.25 in of rain fell (Table 1) later that day to activate the herbicides.

We had an earlier start with this trial in late April, 2016 but had to reset the spring landscape trial for June 27, 2016. Unfortunately, there were no weeds at the earlier start date, even in the controls. The landscape site with even this later start has been kept very weed free for several years with hand-weeding. Also, the maturity of the landscape beds in some cases with full canopy cover makes for little weed competition on the sites.

**Table 1.** Gahanna, OH temperatures and precipitation during Bayer Spring Landscape trial period of (June 27 to Sept. 13, 2016) in Gahanna, OH. *Source:* AccuWeather -- <http://www.accuweather.com/en/us/gahanna-oh/43230/june-weather/2238668?monyr=6/1/2016&view=table>. June was 1°F above normal and had +1.21 inches of rainfall above normal. July was 2°F above average for the month and was -2.3 inches of rainfall drier. August and September were warmer and wetter than average at 4°F and +2.5 inches and 4°F and +1.84 inches, respectively for the month. There were no record highs or lows of rainfall events during this experiment.

Sun 6/26	90°/66°	1.15 IN	84°/64°
Mon 6/27	88°/70°	0.25 IN	84°/64°
Tue 6/28	80°/62°	0 IN	84°/64°
Wed 6/29	77°/59°	0 IN	84°/65°
Thu 6/30	80°/55°	0 IN	85°/65°
Fri 7/1	81°/64°	0.14 IN	85°/65°
Sat 7/2	74°/56°	0 IN	85°/65°
Sun 7/3	73°/62°	0 IN	85°/65°
Mon 7/4	72°/62°	0.11 IN	85°/65°
Tue 7/5	84°/69°	0.31 IN	85°/65°
Wed 7/6	87°/64°	0 IN	85°/65°
Thu 7/7	86°/69°	0 IN	85°/65°
Fri 7/8	85°/73°	0 IN	85°/66°
Sat 7/9	82°/65°	0 IN	85°/66°
Sun 7/10	86°/61°	0 IN	85°/66°
Mon 7/11	88°/64°	0 IN	85°/66°
Tue 7/12	88°/66°	0 IN	85°/66°
Wed 7/13	92°/69°	0.18 IN	85°/66°
Thu 7/14	87°/68°	0.15 IN	85°/66°
Fri 7/15	87°/69°	0 IN	85°/66°
Sat 7/16	82°/67°	0 IN	85°/66°
Sun 7/17	87°/61°	0 IN	85°/66°
Mon 7/18	88°/69°	0.37 IN	85°/66°
Tue 7/19	89°/68°	0 IN	85°/66°
Wed 7/20	89°/66°	0 IN	85°/66°
Thu 7/21	91°/66°	0 IN	85°/66°
Fri 7/22	86°/71°	1.07 IN	85°/66°
Sat 7/23	90°/70°	0 IN	85°/66°
Sun 7/24	94°/74°	0 IN	85°/66°
Mon 7/25	92°/76°	0 IN	85°/66°
Tue 7/26	89°/74°	0 IN	85°/66°
Wed 7/27	91°/72°	0 IN	85°/66°
Thu 7/28	81°/71°	0.13 IN	85°/65°
Fri 7/29	83°/67°	10.03 IN	84°/65°

Sat 7/30	87°/70°	0 IN	84°/65°
Sun 7/31	88°/68°	0 IN	84°/65°
Mon 8/1	87°/68°	0 IN	84°/65°
Tue 8/2	90°/67°	0 IN	84°/65°
Wed 8/3	92°/68°	0 IN	84°/65°
Thu 8/4	88°/72°	0 IN	84°/65°
Fri 8/5	93°/72°	0 IN	84°/65°
Sat 8/6	88°/70°	0.19 IN	84°/65°
Sun 8/7	88°/62°	0 IN	84°/65°
Mon 8/8	87°/68°	0 IN	84°/65°
Tue 8/9	91°/69°	0 IN	84°/65°
Wed 8/10	89°/75°	0 IN	84°/65°
Thu 8/11	93°/76°	10.01 IN	84°/65°
Fri 8/12	94°/77°	0 IN	84°/65°
Sat 8/13	92°/75°	0.38 IN	84°/65°
Sun 8/14	77°/70°	1.34 IN	84°/64°
Mon 8/15	84°/70°	0.42 IN	84°/64°
Tue 8/16	85°/71°	0.57 IN	84°/64°
Wed 8/17	79°/70°	0.18 IN	84°/64°
Thu 8/18	84°/67°	0 IN	84°/64°
Fri 8/19	85°/68°	0 IN	84°/64°
Sat 8/20	83°/68°	0.28 IN	84°/64°
Sun 8/21	78°/64°	0 IN	84°/64°
Mon 8/22	78°/57°	0 IN	84°/64°
Tue 8/23	81°/56°	0 IN	83°/64°
Wed 8/24	84°/62°	0 IN	83°/63°
Thu 8/25	88°/71°	0.58 IN	83°/63°
Fri 8/26	88°/71°	0 IN	83°/63°
Sat 8/27	91°/70°	0.53 IN	83°/63°
Sun 8/28	91°/67°	0.81 IN	83°/63°
Mon 8/29	87°/70°	0 IN	82°/62°
Tue 8/30	87°/64°	0 IN	82°/62°
Wed 8/31	84°/69°	0.53 IN	82°/62°
Thu 9/1	76°/60°	0 IN	82°/62°
Fri 9/2	77°/57°	0 IN	82°/61°
Sat 9/3	79°/57°	0 IN	81°/61°
Sun 9/4	82°/57°	0 IN	81°/61°
Mon 9/5	87°/57°	0 IN	81°/60°
Tue 9/6	89°/65°	0 IN	81°/60°
Wed 9/7	90°/70°	0 IN	80°/60°
Thu 9/8	88°/72°	10.09 IN	80°/60°
Fri 9/9	83°/71°	0.52 IN	80°/59°
Sat 9/10	88°/63°	0.76 IN	79°/59°

Sun 9/11	74°/57°	0 IN	79°/58°
Mon 9/12	79°/55°	0 IN	79°/58°
Tue 9/13	82°/56°	0 IN	78°/58°

The five species evaluated were *Iris germanica* (Bearded iris), *Ajuga reptans* (Bugleweed), *Phalaris arundinacea* var. *picta* 'Picta' (Ribbon grass), *Sedum* sp., and *Calamagrostis x acutiflora* 'Karl Foerster' (Feather reed grass). There were five treatments applied to each species with three replications. The treatments included an untreated control, Specticle G at 150 lb/ac, Specticle Flo at 9 oz/ac, Specticle G at 200 lb/ac and Snapshot 2.5 TG at 150 lb/ac. Osmocote Pro 17-5-11 (3-4 month) fertilizer was applied at 3 lb/1000 ft<sup>2</sup> of landscape bed. Phytotoxicity was scored as indicated in the foreword at regular intervals over the experimental period (Table 2 and 3) for 15 plots per species or 75 plots total.

## Results:

The treatment with the greatest phytotoxicity was the Specticle Flo at 9 oz/ac. This treatment caused some unacceptable injury in all species with the exception of *Calamagrostis x acutiflora* 'Karl Foerster' (Feather reed grass). The most severe injury occurred to *Phalaris arundinacea* var. *picta* 'Picta' (Ribbon grass) and *Ajuga reptans* (Bugleweed) (Table 2). *Sedum* sp. also suffered major injury with the Specticle Flo but not as severely as *Ajuga* and *Phalaris* (Table 2). *Iris* only had unacceptable injury on one date, 12 WAT (Table 2).

Unacceptable injury started in the *Ajuga* at 2 WAT with significant chlorosis and necrotic spotting (Fig. 1) (Table 2). At 4 WAT, chlorosis had progressed to severe necrosis and death in the *Ajuga* with Specticle Flo (Fig. 2A). By 6 WAT the *Ajuga* was almost completely dead (Fig. 2B) (Table 2). The *Ajuga* at 8 WAT was dead (Fig. 3A), because the Bayer phytotoxicity scale does not have a designation for complete kill, they received a 1.0 ratings (Table 2) on this date. Re-growth was occurring in the Specticle Flo 9 oz/ac plots by 10 WAT (Fig. 3 B) (Table 2); unfortunately, weeds and volunteer plants had been able to establish (Table 3) in the damaged areas and thrive by 12 WAT (Fig. 4) (Table 3).

*Phalaris arundinacea* var. *picta* 'Picta' (Ribbon grass) injury with Specticle Flo began at 2 WAT (Table 2) (Fig. 5A) and progressed at 4WAT (Fig. 5B) with some recovery beginning at 8 WAT. Again, as in the *Ajuga*, the death allowed some weeds to invade (Table 3); however, weed control was weaker with the Snapshot at 10 and 12 WAT (Fig. 6) then it was in the Specticle Flo plots. Even the control plots of Ribbon grass suffered some injury (Table 2) as the plots were under a large shade tree (Fig. 7) and competed for water especially in the dry conditions of July (Table 1).

Injury in *Sedum* sp. started at 4 WAT with Specticle Flo (Table 2) with only slight stunting and yellowing (Fig. 8). It progressed in severity at 6 WAT (Fig. 9A) (Table 2) and started to show some recovery by 8 WAT (Table 2). Weed growth in the Specticle G 200 lb/ac treatment was considered related more to herbivore attack than failure of the herbicide (Table 3) (Fig. 9B).

The only other treatment to cause any unacceptable injury was the Specticle 200 lb/ac in the *Phalaris arundinacea* var. *picta* 'Picta' (Ribbon grass) with an impact at the end of the trial 10 WAT and 12 WAT (Table 2). This injury was considered partial due to light and water competition occurring with the placement of the Ribbon grass in the landscape (Fig. 7) together with the treatment effect.

Unacceptable efficacy in the trial was found primarily in the controls of each species (Table 3). The only exception was the *Calamagrostis x acutiflora* 'Karl Foerster' (Feather reed grass) and Ribbon grass (already discussed with Snapshot (Table 2). The weed pressure in the feather reed grass was primarily from volunteer seedlings of *Hibiscus* (Fig. 10). The greatest weed pressure was in the *Iris* with *Taraxacum officinale* (Dandelion), *Euphorbia maculata* (Prostrate spurge), *Digitaria sanguinalis* (Large crabgrass), *Sonchus oleraceus* (Annual Sowthistle), *Oxalis corniculata* (Creeping oxalis) and *Rudbeckia fulgida* (Coneflower) volunteer (Fig. 11 A, B and C.)

## Conclusions:

Specticle G at 150 or 200 lb/ac and Specticle Flo performed as well or better than the industry standard Snapshot for efficacy. Due to phytotoxicity, however, I would not recommended Specticle Flo as a landscape over-the-top treatment in the spring. Phytotoxicity was severe and long-lasting in many species. At five months after treatment the *Ajuga* have almost completely recovered; however, the *Phalaris arundinacea* have not. A companion study of this trial with a fall application is on-going and is showing more weed growth than in the spring trial. Again, however, phytotoxicity with Specticle Flo at 9 oz/ac is occurring. Evaluations with this fall study will continue into spring.

**Table 2.** Bayer Specticle G and Specticle Flo 2016 landscape application trial means of phytotoxicity by species, treatment and evaluation date. Averages for each treatment are also listed by species. Bolded values indicate when injury occurred above acceptable.

*Iris germanica*

Treatment	Rate/ac	1 WAT	2 WAT	4 WAT	6 WAT	8 WAT	10 WAT	12 WAT	Average
Control	--	10.0 <sup>2</sup> a <sup>x</sup>	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a
Specticle G	200 lb	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a
Specticle Flo	9 oz	10.0a	10.0a	10.0a	10.0a	8.3b	7.3b	<b>6.0b</b>	8.8b
Specticle G	150 lb	10.0a	10.0a	10.0a	10.0a	10.0b	10.0a	10.0a	10.0a
SnapShot	150 lb	10.0a	10.0a	10.0a	10.0a	10.0b	10.0a	10.0a	10.0a

*Ajuga reptans*

Treatment	Rate/ac	1 WAT	2 WAT	4 WAT	6 WAT	8 WAT	10 WAT	12 WAT	Average
Control	--	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a
Specticle G	200 lb	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a
Specticle Flo	9 oz	10.0a	<b>4.7b</b>	<b>3.7b</b>	<b>2.0b</b>	<b>1.0c</b>	<b>2.0c</b>	<b>3.3c</b>	<b>3.8c</b>
Specticle G	150 lb	10.0a	10.0a	10.0a	10.0a	9.7a	9.0a	9a	9.7a
SnapShot	150 lb	10.0a	7.0a	9.3a	9.3a	8.0b	8.3b	8.3b	8.6b

*Phalaris arundinacea* var. *picta* 'Picta'

Treatment	Rate/ac	1 WAT	2 WAT	4 WAT	6 WAT	8 WAT	10 WAT	12 WAT	Average
Control	--	10.0a	10.0a	10.0a	10.0a	9.7ab	8.7ab	8.3b	9.5a
Specticle G	200 lb	10.0a	9.3a	7.7b	9.0a	8.3b	<b>6.0c</b>	<b>6.0c</b>	8.0b
Specticle Flo	9 oz	10.0a	<b>5.0b</b>	<b>2.7c</b>	<b>2.7c</b>	<b>3.3c</b>	<b>4.0d</b>	<b>4.3d</b>	<b>4.6c</b>
Specticle G	150 lb	10.0a	10.0a	8.0b	8.3b	8.6ab	8.3b	8.7ab	8.8ab
SnapShot	150 lb	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a

*Sedum*

Treatment	Rate/ac	1 WAT	2 WAT	4 WAT	6 WAT	8 WAT	10 WAT	12 WAT	Average
Control	--	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a
Specticle G	200 lb	10.0a	9.3a	8.7a	9.0a	8.7a	8.7ab	8.3b	9.0a
Specticle Flo	9 oz	10.0a	10.0a	9.3a	<b>5.0b</b>	<b>5.7b</b>	<b>5.7c</b>	<b>6.0c</b>	7.4b
Specticle G	150 lb	10.0a	10.0a	9.3a	9.3a	8.7a	8.3b	8.3b	9.1a
SnapShot	150 lb	10.0a	10.0a	10.0a	10.0a	9.7a	9.7ab	9.3ab	9.8a

*Calamagrostis x acutiflora* 'Karl Foerster'

Treatment	Rate/ac	1 WAT	2 WAT	4 WAT	6 WAT	8 WAT	10 WAT	12 WAT	Average
Control	--	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a
Specticle G	200 lb	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a
Specticle Flo	9 oz	10.0a	10.0a	8.6a	10.0a	10.0a	10.0a	10.0a	9.8a
Specticle G	150 lb	10.0a	10.0a	9.3a	9.0a	8.3b	7.7b	<b>6.0b</b>	8.6a
SnapShot	150 lb	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a

Z = Ratings are based on a scale of 1-10 where 1=significant damage, 6=min. acceptable damage and 9-10=equal or better than control.

X = Treatments with different letters signify phytotoxicity was statistically different at p=0.05 using LS means.

**Table 3.** Bayer Specticle G and Specticle Flo 2016 landscape application trial means of efficacy by species, treatment and evaluation date. Averages for each treatment are also listed by species. Bolded values indicate when control went below acceptable.

*Iris germanica*

Treatment	Rate/ac	1 WAT	2 WAT	4 WAT	6 WAT	8 WAT	10 WAT	12 WAT	Average
Control	--	10.0 <sup>2</sup> a <sup>x</sup>	10.0a	9.0a	7.7b	7.3b	<b>6.3b</b>	<b>5.3b</b>	7.9b
Specticle G	200 lb	10.0a	10.0a	10.0a	10.0a	9.3a	9.0a	8.3a	9.5ab
Specticle Flo	9 oz	10.0a	10.0a	10.0a	9.3a	9.3a	9.3a	8.7a	9.5ab
Specticle G	150 lb	10.0a	10.0a	10.0a	10.0a	9.0a	8.7a	8.0a	9.4a
SnapShot	150 lb	10.0a	10.0a	9.3a	9.0a	9.3a	8.7a	8.0a	9.2a

*Ajuga reptans*

Treatment	Rate/ac	1 WAT	2 WAT	4 WAT	6 WAT	8 WAT	10 WAT	12 WAT	Average
Control	--	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a
Specticle G	200 lb	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a
Specticle Flo	9 oz	10.0a	10.0a	10.0a	10.0a	9.3a	9.7a	8.3b	9.6a
Specticle G	150 lb	10.0a	10.0a	10.0a	10.0a	9.7a	9.3a	9.0a	9.7a
SnapShot	150 lb	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a

*Phalaris arundinacea* var. *picta* 'Picta'

Treatment	Rate/ac	1 WAT	2 WAT	4 WAT	6 WAT	8 WAT	10 WAT	12 WAT	Average
Control	--	10.0a	10.0a	9.3a	7.7b	8.0b	<b>7.0b</b>	<b>6.3c</b>	8.2b
Specticle G	200 lb	10.0a	10.0a	9.7a	9.7a	9.7a	9.0a	9.0a	9.6ab
Specticle Flo	9 oz	10.0a	10.0a	8.7a	8.7ab	8.7ab	8.3ab	8.3ab	8.9ab



Specticle G	150 lb	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a
SnapShot	150 lb	10.0a	10.0a	9.3a	10.0a	10.0a	<b>7.0b</b>	<b>7.0bc</b>	9.0ab

***Sedum***

Treatment	Rate/ac	1 WAT	2 WAT	4 WAT	6 WAT	8 WAT	10 WAT	12 WAT	Average
Control	--	10.0a	9.0a	8.7a	<b>7.0b</b>	<b>7.0c</b>	<b>6.7c</b>	<b>6.3c</b>	7.8b
Specticle G	200 lb	10.0a	10.0a	9.7a	8.7a	8.3bc	7.7bc	7.7bc	8.9ab
Specticle Flo	9 oz	10.0a	10.0a	9.7a	9.3a	9.3ab	8.7ab	8.3b	9.3a
Specticle G	150 lb	10.0a	10.0a	10.0a	10.0a	10.0a	9.7a	9.3ab	9.8a
SnapShot	150 lb	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a

***Calamagrostis x acutiflora* 'Karl Foerster'**

Treatment	Rate/ac	1 WAT	2 WAT	4 WAT	6 WAT	8 WAT	10 WAT	12 WAT	Average
Control	--	10.0a	8.0b	<b>7.0b</b>	<b>6.7b</b>	<b>6.3b</b>	<b>5.3d</b>	<b>5.0d</b>	<b>6.9c</b>
Specticle G	200 lb	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a
Specticle Flo	9 oz	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a	10.0a
Specticle G	150 lb	10.0a	10.0a	9.0a	9.3a	9.0a	8.3b	7.7bc	9.0ab
SnapShot	150 lb	10.0a	9.0a	8.7a	7.3b	7.3b	<b>6.7c</b>	<b>6.7c</b>	8.0bc

Z = Ratings are based on a 0-10 scale with 10 being complete control, 0 no weed control, and  $\geq 7$  commercially acceptable control. Ratings are averaged over three replications.

X = Treatments with different letters signify efficacy was statistically different at  $p=0.05$  using LS means.



**Fig. 1. A and B. A. (Above).** Significant injury on *Ajuga reptans* from Specticle Flo (9 oz/ac) compared to no injury from **B.** Specticle G (150 lb) at 2 WAT. Trial is located in a mature landscape in Gahanna, OH.



**Fig. 2. A and B. A. (Above).** Significant chlorosis injury on *Ajuga reptans* from Specticle Flo (9 oz/ac) at 4 WAT and progressing to **B. (Above )** severe necrosis and death from Specticle Flo (9 oz/ac) at 6 WAT. This trial was located in a mature landscape in Gahanna, OH. Photo by: H. Mathers.





**Fig. 3. A and B. A. (Above).** At 8 WAT *Ajuga reptans* was completely killed from Specticle Flo (9 oz/ac). **B. (Below)** The Specticle Flo (9 oz/ac) treated plants eventually started to grow back via spreading from surrounding plants at 10 WAT; however, before that occurred weeds invaded in injured areas. This trial was located in a mature landscape in Gahanna, OH. Photo by: H. Mathers.







**Fig. 4.** At 12 WAT (Sept. 13, 2016) *Ajuga reptans* was re-growing following Specticle Flo (9 oz/ac) applications made on June 27, 2016. **B. (Below)** The Specticle Flo (9 oz/ac), however, the death in the *Ajuga* had allowed weeds and volunteer plants to invade the injured areas. This trial was located in a mature landscape in Gahanna, OH. Photo by: H. Mathers.



**Fig. 5. A and B.** **A. (Above left)** At 2 WAT *Phalaris arundinacea* var. *picta* 'Picta' (Ribbon grass) was suffering chlorosis and necrosis from Specticle Flo (9 oz/ac) applications made on June 27, 2016. **B. (Above right)** at 4 WAT Specticle Flo (9 oz/ac) had caused severe injury and death. This trial was located in a mature landscape in Gahanna, OH. Photo by: H. Mathers.





**Fig. 6. (Left)** At 12 WAT the plots of *Phalaris arundinacea* var. picta 'Picta' (Ribbon grass) treated with Snapshot had below acceptable weed control with invading volunteer *Chasmanthium latifolium* and *Vinca minor*. This trial was located in a mature landscape in Gahanna, OH. Photo by: H. Mathers.



**Fig. 7. (Left)** *Phalaris arundinacea* var. picta 'Picta' (Ribbon grass) at 2WAT with no injury showing the plots were located in heavy shade and competed for water with a large tree to the left of the photo. This trial was located in a mature landscape in Gahanna, OH. Photo by: H. Mathers.

**Fig. 8. (Right)** *Sedum* sp. at 4 WAT with Specticle Flo in the right foreground are showing some minor stunting and yellowing. This trial was located in a mature landscape in Gahanna, OH. Photo by: H. Mathers.







**Fig. 9. A and B. A. (Above)** *Sedum* sp. at 6 WAT with Specticle Flo. The stunting that began at 4 WAT has increased vs control plots to the far right of the photo. Volunteer lily, *Rudbeckia* and *Echinacea* are present. **B. (Right)** *Sedum* sp. at 12 WAT treated with Specticle G 200 lb/ac was showing some invasion of *Vinca minor* and *Viola tricolor* (not seen); however, weevil or another herbivore were considered the primary cause of crown opening and weed emergence. This trial was located in a mature landscape in Gahanna, OH. Photo by: H. Mathers.





**Fig. 10. A and B. A. (Upper above)** Weed control in *Calamagrostis x acutiflora* 'Karl Foerster' (Feather reed grass) at 4 WAT with various treatments and **B. (Lower above)** in the control. Photo by: H. Mathers.





**Fig. 11 A, B, and C.** Several species of weed were present in the *Iris germanica* control including **A. (Top Left)** *Sonchus oleraceus* (Annual Sowthistle), *Poa annua* and clover; **B. (Middle Left)** *Taraxacum officinale* (Dandelion), *Digitaria sanguinalis* (Large crabgrass), and *Rudbeckia fulgida* (Coneflower) volunteer; and , **C. (Lower Right)** *Euphorbia maculata* (Prostrate spurge) and *Oxalis corniculata* (Creeping oxalis). Photos by: H. Mathers.