Mesotrione Impregnated on Fertilizer for Weed Control at Seeding

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A study was conducted at the Washington State University Turfgrass and Agronomy Research Center (TARC) in Pullman, WA on four different cool-season turfgrass species ('Treasure' chewings fescue, 'NuDestiny' Kentucky bluegrass, 'Gallery' perennial ryegrass, and 'Inferno' tall fescue). The objective was to evaluate the effect of mesotrione impregnated on fertilizer to control weeds when applied at seeding in both the summer and fall. Separate 80' x 80' study areas were used in the summer and fall (Figure 1). These study areas were irrigated with 0.25 inches of water within the first 24 hours of mesotrione application, followed by a watering schedule to promote germination and turfgrass growth. Within each study area all four turfgrass species were planted, each in a 36' x 36' block on 8 June 06 (summer), and 1 September 06 (fall). Individual plot size was 6' x 12' in both trials. Weeds in the study were naturally occurring and no additional weeds were planted.

The first mesotrione application was applied immediately following seeding, on 8 June 06 (summer) and on 1 September 06 (fall) with a Scotts SS-2 drop spreader. One day before the second mesotrione application, on 20 July 06, the study area was mown to a height of two inches. Following the second mesotrione application, the study area was irrigated with 0.25 inches of water. Irrigation after this date was provided as needed. The study area in the fall was not mown during data collection and was irrigated as needed. Each week, beginning two weeks after first treatment, phytotoxicity, total weeds, number of broadleaf weeds, number of grassy weeds, turfgrass color, and percent turfgrass cover were rated. In the fall trial, the same ratings were taken, but beginning one week after planting and continuing weekly, up to week six. Phytotoxicity was rated on a scale of 1-9, with 9 = dead turf. Weed counts were taken by randomly placing a 1' x 2' quadrat in each plot. Turfgrass color was rated visually on a scale of 1-9, with 9 = dark green. Percent turfgrass cover was rated visually and expressed as a percent of the ground covered with the planted grass species.

The following weeds were present in the study area: pigweed *Amaranthus spp*., common lambsquarter *Chenopodium album*, prickly lettuce *Lactuca serriola*, pineappleweed *Matricaria matricarioides*, canada thistle *Cirsium arvense*, mayweed chamomile *Anthemis cotula*, common groundsel *Senecio vulgaris*, common mallow *Malva neglecta*, shepardspurse *Capsella bursa-pastoris*, henbit *Lamium amplexicaule,* redstem filaree *Erodium cicutarium,* witchgrass *Panicum capillare*, and barnyardgrass *Echinochloa crus-galli*.

RESULTS

Phytotoxicity:

Generally, the mesotrione impregnated fertilizer, EXC 869 (565 g ai/ha), always had the highest phytotoxicity rating regardless of species (Tables 1-4). The siduron impregnated fertilizer, EXC 926 (6700 g ai/ha), had lower phytotoxicity ratings across all species, but was often equivalent to EXC 866 (161 g ai/ha). When comparing fall and spring applications, there did not appear to be a difference concerning phytotoxicity.

Acceptable phytotoxicity can be classified as phytotoxicity values of 2 and below. 'Treasure' chewings fescue showed high levels of phytotoxicity through week three with all mesotrione treatments following the 8 June 06 and 1 September 06 applications. One week following the split application of mesotrione impregnated fertilizer there were low to moderate levels of phytotoxicity, and no phytotoxicity after week 8. The siduron treatment showed very low phytotoxicity after the first application and no phytotoxicity after the second application. Mesotrione impregnated on fertilizer does not appear to be safe when applied on 'Treasure' chewings fescue at planting regardless of the rate or timing (Table 1 and Figure 3).

Table 1. Phytotoxicity of mesotrione and siduron impregnated fertilizers when applied to 'Treasure' chewings fescue at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code*	Timing	Phytotoxicity (1-9; 9=dead turf)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT**	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	2.7 c****	5.7 b	0.0 a	0.0 a	0.7 c	0.0 c	0.0 a	0.0 a	0.0 a
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		6.0 ab	6.3 b	0.0 a	0.0 a	2.3 b	0.3 bc	0.0 a	0.0 a	0.0 a
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		5.3 b	6.7 b	0.0 a	0.0 a	2.0 b	0.7 ab	0.0 a	0.0 a	0.0 a
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		7.0 a	8.0 a	0.0 a	0.0 a	3.0 a	1.0 a	0.0 a	0.0 a	0.0 a
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		0.0 d	0.0 d	0.0 a	0.0 a	0.0 d	0.0 c	0.0 a	0.0 a	0.0 a
6	CHECK UNTREATED			Summer		0.0 d	1.3 c	0.0 a	0.0 a	0.0 d	0.0 c	0.0 a	0.0 a	0.0 a
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	2.0 c	2.7 c**	1.3 c	0.7 c	0.3 c	0.0 c	****			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	4.7 b	4.3 b	4.0 b	2.3 b	2.0 b	1.7 b				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	4.7 b	4.3 b	3.0 b	3.0 b	2.7 b	2.7 ab				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	5.7 a	7.0 a	6.7 a	5.0 a	4.3 a	3.3 a				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	0.7 d	0.0 d	0.0 c	0.0 c	0.3 c	0.0 c				
12	CHECK UNTREATED			Fall	0.0 d	0.0 d	0.0 c	0.0 c	0.0 c	0.0 c				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006

** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.

*** Cells highlighted in gray represent dates in which no data was taken.

**** Values within a column and timing followed by the same letter are not significantly different. LSD *P* =0.05.

'Gallery' perennial ryegrass had acceptable phytotoxicity ratings for all mesotrione impregnated fertilizer treatments in all weeks following the initial application in the summer trial, except EXC 869. Up to three weeks after the 8 June 06 application, EXC 869 produced unacceptable levels phytotoxicity. After week three, all treatments had acceptable levels of phytotoxicity. Following the split application, no phytotoxicity was observed. The siduron impregnated fertilizer, EXC 926, always produced acceptable phytotoxicity values. In the fall trial, all treatments of mesotrione and siduron impregnated fertilizers were safe except EXC 869. Up to two weeks after the 1 September 06 application, EXC 869 produced high levels of phytotoxicity (Table 2).

Table 2. Phytotoxicity of mesotrione and siduron impregnated fertilizers when applied to 'Gallery' perennial ryegrass at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Phytotoxicity (1-9;9=dead turf)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	0.7 bc ****	1.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		1.3 b	1.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		1.3 b	1.7 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		5.0 a	4.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		0.3 c	0.3 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
6	CHECK UNTREATED			Summer		0.0 c	1.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	0.7 c	0.3 c	0.0 b	0.7 a	0.3 a	0.0 a	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	1.0 bc	1.0 b	0.7 ab	0.7 a	0.3 a	0.0 a				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	2.0 b	1.3 b	0.7 ab	1.0 a	0.0 a	0.0 a				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	5.7 a	5.0 a	1.3 a	1.0 a	0.0 a	0.0 a				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	0.0 c	0.0 c	0.7 ab	0.0 b	0.0 a	0.0 a				
12	CHECK UNTREATED			Fall	0.0 c	0.0 c	0.0 b	0.0 b	0.0 a	0.0 a				

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** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD *P* =0.05.

'NuDestiny' Kentucky bluegrass was not significantly injured by any mesotrione application in either the summer or fall trial, except for with EXC 869 at 3 and 4 WAT in the summer and at 1 and 2 WAT in the fall (Table 3).

Table 3. Phytotoxicity of mesotrione and siduron impregnated fertilizers when applied to 'NuDestiny' Kentucky bluegrass at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Phytotoxicity (1-9;9=dead turf)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***		0.0 b ****	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer			0.3 b	2.0 ab	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer			0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer			1.0 a	4.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer			0.0 b	2.3 ab	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
6	CHECK UNTREATED			Summer			0.0 b	1.0 ab	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	0.3 a	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	0.3 a	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	0.7 a	0.3 ab	0.0 a	0.0 a	0.0 a	0.0 a				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	0.7 a	0.7 a	0.0 a	0.0 a	0.0 a	0.0 a				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a				
12	CHECK UNTREATED			Fall	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a				

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** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
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**** Values within a column and timing followed by the same letter are not significantly different. LSD P=0.05.

Response of 'Inferno' tall fescue and 'Gallery' perennial ryegrass to phytotoxicity of mesotrione were similar. In the summer trial, all treatments proved to be safe from 4 WAT to the end of the study. Treatments with unacceptable levels of phytotoxicity included mesotrione impregnated fertilizers EXC 867 and EXC 869 at 2 and 3 WAT. All fall treatments provided acceptable phytotoxicity levels at 2 WAT, except for with EXC 869, which provided acceptable phytotoxicity at 4 WAT (Table 4).

Table 4. Phytotoxicity of mesotrione and siduron impregnated fertilizers when applied to 'Inferno' tall fescue at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Phytotoxicity (1-9;9=dead turf)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	0.0 b ****	2.0 b	0.0 a	0.0 a	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		2.7 ab	2.7 ab	0.0 a	0.0 a	1.0 ab	0.0 a	0.0 a	0.0 a	0.0 a
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		1.0 b	1.7 b	0.0 a	0.0 a	0.3 bc	0.0 a	0.0 a	0.0 a	0.0 a
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		5.0 a	4.0 a	0.0 a	0.0 a	1.7 a	0.7 a	0.0 a	0.0 a	0.0 a
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		0.0 b	3.0 ab	0.0 a	0.0 a	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a
6	CHECK UNTREATED			Summer		0.0 b	2.7 ab	0.0 a	0.0 a	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	1.0 c	0.3 c	0.0 c	0.0 c	0.7 a	0.0 a	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	2.3 b	1.7 b	1.3 b	0.7 b	0.3 a	0.0 a				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	2.0 b	1.7 b	1.0 b	1.0 b	0.3 a	0.0 a				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	4.0 a	2.7 a	2.3 a	2.0 a	0.3 a	0.3 a				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	0.7 cd	0.0 c	0.0 c	0.0 c	0.0 a	0.0 a				
12	CHECK UNTREATED			Fall	0.0 d	0.0 c	0.0 c	0.0 c	0.0 a	0.0 a				

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** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD $P=0.05$.

Total Weeds:

Total weeds in the summer trial included both grass and broadleaf weeds, however in the fall only broadleaf weeds were present. Mesotrione impregnated fertilizers EXC 868 and EXC 869 provided the best overall weed control, while EXC 926, followed by EXC 866 provided the least overall weed control. EXC 867 typically provided acceptable levels of weed control, although not always greater than 85%.

Specifically, in 'Treasure' chewings fescue, EXC 868 had greater than 85% weed control in all observed weeks of the summer trial. However, all impregnated fertilizer treatments were statistically the same as EXC 868 except at 10 WAT. In the fall, all mesotrione impregnated fertilizer treatments were statistically equivalent in each week but did provide better control than the untreated check plot. The siduron impregnated fertilizer was not statistically different than any of the mesotrione impregnated fertilizer treatments from 1 WAT to 4 WAT, but had higher total weed counts at 5 and 6 WAT in the fall trial (Table 5).

Table 5. Total weed number in 'Treasure' chewings fescue in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Total Weed Number (broadleaf and grass, per 2 square feet)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	1.7 b ****	3.0 ab	1.0 b	1.7 a	1.3 ab	1.7 b	3.3 ab	3.7 ab	2.7 b
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		1.3 b	1.3 b	5.7 ab	5.3 a	4.0 ab	2.7 ab	0.7 b	1.0 b	1.0 bc
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		0.0 b	0.0 b	0.3 b	0.7 a	0.3 b	0.0 b	0.0 b	0.0 b	0.0 c
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		0.7 b	5.7 ab	6.0 ab	5.0 a	3.3 ab	2.7 ab	1.7 b	1.3 b	0.7 bc
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		3.3 b	2.0 b	1.3 b	2.0 a	1.0 ab	0.7 b	1.0 b	1.0 b	2.7 b
6	CHECK UNTREATED			Summer		18.3 a	10.7 a	12.3 a	13.3 a	7.7 a	6.0 a	7.3 a	7.0 a	5.7 a
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	1.7 b	2.7 b	2.0 b	0.7 b	0.3 bc	0.0 c	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	6.3 ab	2.3 b	1.0 b	0.7 b	0.3 bc	0.0 c				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	4.0 b	2.3 b	1.7 b	0.0 b	0.0 c	0.0 c				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	1.7 b	0.7 b	1.0 b	0.0 b	0.0 c	0.0 c				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	8.7 ab	6.7 b	8.0 b	6.0 b	7.0 b	7.7 b				
12	CHECK UNTREATED			Fall	15.0 a	21.0 a	23.3 a	13.3 a	14.3 a	16.0 a				

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*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD *P* =0.05.

'Gallery' perennial ryegrass germinated quickly and provided a high level of competition to weeds. Additionally, it had relatively low levels of phytotoxicity. These factors may have contributed to all treatments providing excellent weed control in the summer trial. All treatments in all weeks provided greater than 80% weed control when compared to the check. EXC 866, 867, 869, and 926 controlled more than 85% of the weeds in all observed weeks. In the fall trial, EXC 867 provided the best overall weed control. All mesotrione impregnated fertilizer treatments provided very good weed control (Table 6).

Table 6. Total weed number in 'Gallery' perennial ryegrass in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Total Weed Number (broadleaf and grass, per 2 square feet)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	1.3 b ****	0.3 b	0.0 b	0.3 b	0.3 b	0.0 b	0.0 b	0.0 b	0.0 b
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		1.3 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		0.3 b	0.3 b	1.7 b	1.0 b	0.7 b	0.7 b	0.3 b	0.7 b	0.3 b
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		0.7 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		1.0 b	0.0 b	0.0 b	0.7 b	1.0 b	0.3 b	0.0 b	0.0 b	0.0 b
6	CHECK UNTREATED			Summer		18.7 a	9.7 a	10.0 a	5.3 a	5.3 a	6.3 a	5.3 a	5.3 a	3.7 a
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	4.7 b	3.3 b	2.0 b	1.7 b	1.0 c	2.3 bc	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	2.7 b	2.7 b	2.7 b	0.7 b	0.0 c	0.0 c				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	5.0 b	3.7 b	1.3 b	0.0 b	0.0 c	0.0 c				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	6.3 b	3.7 b	0.3 b	0.0 b	0.0 c	0.0 c				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	8.3 b	8.3 b	3.0 b	3.0 b	4.3 b	4.3 b				
12	CHECK UNTREATED			Fall	19.3 a	18.0 a	17.3 a	12.0 a	12.7 a	12.7 a				

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*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD *P* =0.05.

'NuDestiny' Kentucky bluegrass did not germinate quickly, but was quite tolerant to mesotrione applications. In the summer trial, EXC 869 had greater than 85% weed control in all observed weeks, although not statistically different at 9 or 10 WAT. EXC 867 had greater than 85% weed control in all weeks except at week 7. EXC 866, 868, and 926 never attained 85% weed control in any observed week. In the fall trial, all mesotrione impregnated fertilizer treatments provided statistically the same level of weed control. The siduron impregnated fertilizer provided statistically the same level of weed control as the mesotrione impregnated fertilizer in all weeks (Table 7).

Table 7. Total weed number in 'NuDestiny' Kentucky bluegrass in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Total Weed Number (broadleaf and grass, per 2 square feet)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***		6.0 b ****	6.3 b	5.0 b	7.0 a	7.3 a	5.0 ab	4.0 a	3.0 a
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer			0.7 b	0.0 c	0.0 c	0.0 b	1.3 bc	0.7 bc	0.7 a	1.3 a
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer			2.0 b	1.7 bc	1.0 c	1.7 b	2.3 bc	1.7 abc	1.0 a	1.7 a
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer			1.0 b	0.3 c	0.3 c	0.0 b	0.0 c	0.3 c	0.3 a	0.7 a
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer			3.0 b	2.0 bc	2.3 bc	2.0 b	2.3 bc	1.7 abc	1.7 a	2.3 a
6	CHECK UNTREATED			Summer			17.0 a	12.7 a	9.7 a	6.7 a	5.0 ab	5.7 a	5.0 a	3.7 a
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	9.0 a	7.7 ab	1.3 b	0.0 b	0.0 b	0.0 b	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	7.3 a	5.7 ab	2.3 b	0.0 b	0.0 b	0.0 b				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	6.7 a	3.7 b	2.0 b	0.0 b	0.3 b	0.0 b				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	8.3 a	7.3 ab	3.0 b	0.0 b	0.0 b	0.0 b				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	8.3 a	7.7 ab	11.3 ab	6.3 ab	8.0 ab	7.7 ab				
12	CHECK UNTREATED			Fall	19.3 a	17.7 a	15.7 a	13.0 a	15.3 a	14.0 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006
** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD P=0.05.

All mesotrione impregnated fertilizer treatments in the summer trial provided excellent weed control in 'Inferno' tall fescue. Mesotrione impregnated fertilizer EXC 869 had 100% weed control in all weeks. All other mesotrione impregnated fertilizer treatments were statistically the same, and the siduron impregnated fertilizer, EXC 926, always had significantly lower levels of weed control. Similar results were found in the fall trial. All mesotrione impregnated fertilizers provided statistically higher levels of weed control than the siduron impregnated fertilizer (Table 8).

Table 8. Total weed number in 'Inferno' tall fescue in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Total Weed Number (broadleaf and grass, per 2 square feet)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	1.0 c ****	0.3 b	1.7 c	0.7 b	1.3 b	1.0 b	1.3 bc	1.3 c	1.0 bc
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		0.3 c	2.0 b	0.7 c	0.0 b	0.0 b	0.0 b	0.0 c	0.0 c	0.0 c
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		0.7 c	0.3 b	1.0 c	0.7 b	0.7 b	0.7 b	0.3 bc	0.3 c	0.0 c
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		0.0 c	0.0 b	0.0 c	0.0 b	0.0 b	0.0 b	0.0 c	0.0 c	0.0 c
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		10.7 b	5.7 ab	6.0 b	3.3 b	4.3 ab	2.3 b	2.7 b	3.3 b	2.3 b
6	CHECK UNTREATED			Summer		18.0 a	11.3 a	10.0 a	7.3 a	8.0 a	5.0 a	7.3 a	7.3 a	5.7 a
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	3.3 b	1.7 c	1.0 c	2.0 b	0.7 b	0.7 c	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	6.7 ab	2.7 c	1.7 c	1.7 b	0.3 b	1.0 c				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	5.7 ab	2.3 c	0.7 c	0.3 b	0.7 b	0.0 c				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	5.7 ab	0.0 c	0.0 c	0.0 b	0.0 b	0.0 c				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	8.7 ab	18.7 a	17.7 a	15.7 a	6.7 a	8.0 b				
12	CHECK UNTREATED			Fall	11.0 a	13.7 b	14.3 b	12.7 a	10.7 a	11.3 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006
** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD *P* =0.05.

Broadleaf Weeds:

All mesotrione impregnated fertilizer treatments provided the same level of broadleaf weed control in each week of both the summer and fall studies for all turfgrass species (Tables 9-12). When using siduron impregnated fertilizer EXC 926, broadleaf weed control was variable amongst species and timing.

In the summer trial, all mesotrione impregnated fertilizer treatments provided greater than 85% broadleaf weed control when used on 'Treasure' chewings fescue in all weeks. The siduron impregnated fertilizer EXC 926 had greater than 85% broadleaf weed control at 7 WAT only. In the fall trial, all impregnated fertilizer treatments provided statistically the same level of broadleaf weed control from 1-4 WAT. At 5 and 6 WAT, all mesotrione impregnated fertilizers provided statistically higher levels of broadleaf weed control than the siduron impregnated fertilizer (Table 9).

Table 9. Broadleaf weed number in 'Treasure' chewings fescue in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Broadleaf Weed Number (per 2 square feet)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	0.0 b ****	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 c	0.0 c	0.0 b
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		0.3 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 c	0.0 c	0.0 b
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 c	0.0 c	0.0 b
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		0.3 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 c	0.0 c	0.0 b
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		3.3 b	1.7 b	1.0 ab	2.0 b	1.0 b	0.3 b	1.0 b	0.7 b	2.0 a
6	CHECK UNTREATED			Summer		11.0 a	4.0 a	4.3 a	5.3 a	3.7 a	3.3 a	3.3 a	3.7 a	2.7 a
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	1.7 b	2.7 b	2.0 b	0.7 b	0.3 bc	0.0 c	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	6.3 ab	2.3 b	1.0 b	0.7 b	0.3 bc	0.0 c				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	4.0 b	2.3 b	1.7 b	0.0 b	0.0 c	0.0 c				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	1.7 b	0.7 b	1.0 b	0.0 b	0.0 c	0.0 c				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	8.7 ab	6.7 b	8.0 b	6.0 b	7.0 b	7.7 b				
12	CHECK UNTREATED			Fall	15.0 a	21.0 a	23.3 a	13.3 a	14.3 a	16.0 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006

** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.

*** Cells highlighted in gray represent dates in which no data was taken.

**** Values within a column and timing followed by the same letter are not significantly different. LSD *P* =0.05.

'Gallery' perennial ryegrass had the lowest number of broadleaf weeds when compared to the other turfgrass species in the study, in both the summer and fall trials. This is likely associated with the fast germination of perennial ryegrass and the demonstrated turf safety of mesotrione on perennial ryegrass. In the summer trial, all mesotrione impregnated fertilizers, as well as the siduron impregnated fertilizer, had greater than 85% weed control in all weeks. In the fall trial, greater than 85% weed control was attained at 1 WAT only when using EXC 866 and 867, and was only attained at 2 WAT by EXC 867. All mesotrione treatments provided greater than 85% broadleaf weed control at 3-6 WAT. The siduron impregnated fertilizer provided the same level of broadleaf weed control as all mesotrione impregnated fertilizer treatments from 1-4 WAT, and statistically lower levels of broadleaf weed control at 5 and 6 WAT (Table 10).

Table 10. Broadleaf weed number in 'Gallery' perennial ryegrass in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Broadleaf Weed Number (per 2 square feet)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	0.7 b ****	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		0.3 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		0.3 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		0.7 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		1.0 b	0.7 ab	0.0 a	0.7 a	1.0 a	0.3 a	0.0 a	0.0 a	0.0 a
6	CHECK UNTREATED			Summer		11.3 a	1.3 a	0.7 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	4.7 b	3.3 b	2.0 b	1.7 b	1.0 c	2.3 bc	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	2.7 b	2.7 b	2.7 b	0.7 b	0.0 c	0.0 c				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	5.0 b	3.7 b	1.3 b	0.0 b	0.0 c	0.0 c				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	6.3 b	3.7 b	0.3 b	0.0 b	0.0 c	0.0 c				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	8.3 b	8.3 b	3.0 b	3.0 b	4.3 b	4.3 b				
12	CHECK UNTREATED			Fall	19.3 a	18.0 a	17.3 a	12.0 a	12.7 a	12.7 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006

** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.

*** Cells highlighted in gray represent dates in which no data was taken.

**** Values within a column and timing followed by the same letter are not significantly different. LSD $P=0.05$.

'NuDestiny' Kentucky bluegrass lacked the initial competitive ability found with 'Gallery' perennial ryegrass. In the summer trial, greater than 85% weed control was found when using mesotrione impregnated fertilizers EXC 867, 868, and 869 during all weeks and for EXC 866 3-6 WAT. The siduron impregnated fertilizer always had lower levels of broadleaf weed control. In the fall trial, greater than 85% weed control was not attained by any treatment at 1 and 2 WAT. All mesotrione impregnated fertilizer treatments provided greater than 85% broadleaf weed control from 4-6 WAT, and EXC 866, 867, and 868 provided greater than 85% broadleaf weed control at 3 WAT. The siduron impregnated fertilizer never provided greater than 85 % weed control in the fall trial (Table 11).

Table 11. Broadleaf weed number in 'NuDestiny' Kentucky bluegrass in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Broadleaf Weed Number (per 2 square feet)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***		0.0 b ****	0.0 b	0.3 b	0.0 b	0.7 ab	0.3 bc	0.3 b	0.7 ab
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer			0.7 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 c	0.0 b	0.0 b
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer			0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 c	0.0 b	0.0 b
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer			0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 c	0.0 b	0.0 b
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer			8.0 ab	2.0 ab	2.3 ab	2.0 a	2.3 a	1.7 a	1.3 a	1.0 ab
6	CHECK UNTREATED			Summer			12.7 a	3.7 a	3.7 a	2.7 a	1.3 ab	1.3 ab	1.3 a	1.7 a
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	9.0 a	7.7 ab	1.3 b	0.0 b	0.0 b	0.0 b	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	7.3 a	5.7 ab	2.3 b	0.0 b	0.0 b	0.0 b				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	6.7 a	3.7 b	2.0 b	0.0 b	0.3 b	0.0 b				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	8.3 a	7.3 ab	3.0 b	0.0 b	0.0 b	0.0 b				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	8.3 a	7.7 ab	11.3 ab	6.3 ab	8.0 ab	7.7 ab				
12	CHECK UNTREATED			Fall	19.3 a	17.7 a	15.7 a	13.0 a	15.3 a	14.0 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006
** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD $P=0.05$.

All rates and timings of mesotrione impregnated fertilizer provided greater than 85% broadleaf weed control when used on 'Inferno' tall fescue. The only exception was 1 WAT in the fall trial, in which no impregnated fertilizer provided greater than 85% broadleaf weed control. The siduron impregnated fertilizer never attained greater than 85% weed control in the summer or fall trial (Table 12).

Table 12. Broadleaf weed number in 'Inferno' tall fescue in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Broadleaf Weed Number (per 2 square feet)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	0.0 b ****	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 c	0.0 b	0.0 c
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 c	0.0 b	0.0 c
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 c	0.0 b	0.0 c
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 c	0.0 b	0.0 c
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		10.7 a	5.7 a	6.0 a	3.3 a	3.7 a	2.3 a	2.7 b	3.0 a	2.0 b
6	CHECK UNTREATED			Summer		15.7 a	8.3 a	8.0 a	5.0 a	5.3 a	3.7 a	4.7 a	4.7 a	3.7 a
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	3.3 b	1.7 c	1.0 c	2.0 b	0.7 b	0.7 c	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	6.7 ab	2.7 c	1.7 c	1.7 b	0.3 b	1.0 c				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	5.7 ab	2.3 c	0.7 c	0.3 b	0.7 b	0.0 c				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	5.7 ab	0.0 c	0.0 c	0.0 b	0.0 b	0.0 c				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	8.7 ab	18.7 a	17.7 a	15.7 a	6.7 a	8.0 b				
12	CHECK UNTREATED			Fall	11.0 a	13.7 b	14.3 b	12.7 a	10.7 a	11.3 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006
** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD *P* =0.05.

Grass Weeds:

Significant numbers of grass weeds were present only in the summer trial (Tables 13-16). Total grass weed numbers in the untreated check plots were similar in the 'Treasure' chewings fescue, 'Gallery' perennial ryegrass, and 'NuDestiny' Kentucky bluegrass studies, but were lower in the 'Inferno' tall fescue study. Siduron impregnated fertilizer EXC 926 provided the best grass weed control of all treatments; of the mesotrione impregnated fertilizers, EXC 869 and 868 provided the most complete grass weed control across species. Grass weeds present included witchgrass (*Panicum capillare*) and barnyardgrass (*Echinochloa crus-galli*). Mesotrione impregnated fertilizers injured, but did not eradicate these grass species (Figure 2).

Individually, 'Treasure' chewings fescue saw greater than 85% grass weed control from mesotrione impregnated fertilizer EXC 868 and siduron impregnated fertilizer EXC 926 in all observed weeks. Statistically, all treatments in all weeks were not different (Table 13).

Table 13. Grass weed number in 'Treasure' chewings fescue in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Grass Weed Number (per 2 square feet)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	1.7 a ****	3.0 a	1.0 a	1.7 a	1.3 a	1.7 a	3.3 a	3.7 a	2.7 a
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		1.3 a	1.3 a	5.67 a	5.3 a	4.0 a	2.7 a	0.7 a	1.0 ab	1.0 ab
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		0.0 a	0.0 a	0.3 a	0.3 a	0.3 a	0.0 a	0.0 a	0.0 b	0.0 b
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		0.3 a	5.7 a	6.0 a	5.0 a	3.3 a	2.7 a	1.7 a	1.3 ab	0.7 ab
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		0.0 a	0.3 a	0.3 a	0.0 a	0.0 a	0.3 a	0.0 a	0.3 ab	0.7 ab
6	CHECK UNTREATED			Summer		7.3 a	6.7 a	8.0 a	8.0 a	4.0 a	2.7 a	4.0 a	3.3 ab	3.0 a
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				
12	CHECK UNTREATED			Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006
** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD *P* =0.05.

Grass weed control for all treatments on 'Gallery' perennial ryegrass was excellent. Greater than 85% weed control was attained by all treatments in all weeks except for mesotrione impregnated fertilizer EXC 868 at 4, 5, 9, and 10 WAT. It should be noted that EXC 868 was statistically the same as the other impregnated fertilizer treatments in all weeks (Table 14).

Table 14. Grass weed number in 'Gallery' perennial ryegrass in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Grass Weed Number (per 2 square feet)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	0.7 b ****	0.3 b	0.0 b	0.3 b	0.3 b	0.0 b	0.0 b	0.0 b	0.0 b
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		0.0 b	0.0 b	1.7 b	1.0 b	0.7 b	0.7 b	0.3 b	0.7 b	0.3 b
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b
6	CHECK UNTREATED			Summer		7.3 a	8.3 a	9.3 a	5.3 a	5.3 a	6.3 a	5.3 a	5.3 a	3.7 a
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				
12	CHECK UNTREATED			Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006
** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD *P* =0.05.

More than 85% grass weed control was attained in all weeks with mesotrione impregnated fertilizer EXC 869 and siduron impregnated fertilizer EXC 926 when applied to 'NuDestiny' Kentucky bluegrass. Mesotrione impregnated fertilizer EXC 867 had greater than 85% control from 3-6 WAT. No statistical difference among treatments was found at 8-10 WAT (Table 15).

Table 15. Grass weed number in 'NuDestiny' Kentucky bluegrass in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Grass Weed Number (per 2 square feet)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***		5.7 ab ****	6.3 ab	4.7 ab	7.0 a	6.7 a	4.7 a	3.7 a	2.3 a
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer			0.0 c	0.0 b	0.0 c	0.0 c	1.3 b	0.7 a	0.7 a	1.3 a
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer			1.3 bc	1.7 b	1.0 bc	1.7 bc	2.3 ab	1.7 a	1.0 a	1.7 a
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer			1.0 bc	0.3 b	0.3 c	0.0 c	0.0 b	0.3 a	0.3 a	0.7 a
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer			0.0 c	0.0 b	0.0 c	0.0 c	0.0 b	0.0 a	0.3 a	1.3 a
6	CHECK UNTREATED			Summer			8.0 a	9.0 a	6.0 a	4.0 b	3.7 ab	4.3 a	3.7 a	2.0 a
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				
12	CHECK UNTREATED			Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006
** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD *P* =0.05.

Compared to the three other cultivars, the 'Inferno' tall fescue started out with a lower total grass weed number in the untreated check plot. Mesotrione impregnated fertilizer EXC 869 had 100% grass weed control in all observed weeks. Siduron impregnated fertilizer EXC 926 also performed well, with greater than 85% weed control across all observed weeks. Mesotrione impregnated fertilizers EXC 867 and EXC 868 also provided high levels of grass weed control, although not always greater than 85% (Table 16).

Table 16. Grass weed number in 'Inferno' tall fescue in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Grass Weed Number (per 2 square feet)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	1.0 b ****	1.3 ab	1.7 a	1.0 b	1.3 ab	1.0 a	1.3 ab	1.3 b	1.0 ab
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		0.3 b	2.0 ab	0.7 a	0.0 b	0.0 b	0.0 a	0.0 b	0.0 c	0.0 b
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		0.7 b	0.3 ab	1.0 a	0.7 b	0.7 ab	0.7 a	0.3 b	0.3 c	0.0 b
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		0.0 b	0.0 b	0.0 a	0.0 b	0.0 b	0.0 a	0.0 b	0.0 c	0.0 b
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		0.0 b	0.0 b	0.0 a	0.0 b	0.7 ab	0.0 a	0.0 b	0.3 c	0.3 b
6	CHECK UNTREATED			Summer		2.3 a	3.0 a	2.0 a	2.3 a	2.7 a	1.3 a	2.7 a	2.7 a	2.0 a
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				
12	CHECK UNTREATED			Fall	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006
** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD *P* =0.05.

Turfgrass Color:

Overall, no trends were found across species or timings. 'Treasure' chewings fescue had the highest color ratings with mesotrione impregnated fertilizers EXC 866 and 868 in the summer and the highest color ratings with the siduron impregnated fertilizer EXC 926 in the fall. The lowest color ratings for both summer and fall were generally found when using mesotrione impregnated fertilizer EXC 869 (Table 17).

Table 17. Turfgrass color of 'Treasure' chewings fescue in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Turfgrass Color (1-9;9=dark green)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	7.0 a ****	7.0 a	7.0 a	6.3 a	5.3 a	5.7 ab	5.7 a	6.0 a	6.0 a
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		5.7 b	5.7 b	6.3 b	6.3 a	5.7 a	6.0 ab	5.7 a	5.7 ab	5.7 ab
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		6.7 a	6.7 a	7.0 a	7.0 a	5.7 a	6.3 a	6.0 a	6.0 a	6.0 a
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		5.0 b	5.0 b	5.0 c	5.7 ab	5.0 ab	5.3 ab	5.0 ab	5.0 bc	5.0 bc
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		5.3 b	5.3 b	5.0 c	5.7 ab	4.7 ab	5.3 ab	4.3 b	4.7 c	4.7 c
6	CHECK UNTREATED			Summer		5.7 b	5.7 b	5.3 c	4.7 b	4.0 b	4.7 b	5.0 ab	5.3 abc	5.3 abc
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	6.0 ab	5.3 b	5.7 a	6.0 a	6.0 bc	6.0 b	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	5.0 b	3.7 c	4.0 bc	4.7 b	5.0 d	5.3 b				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	5.0 b	4.0 c	4.3 b	4.3 bc	5.3 cd	5.3 b				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	5.0 b	3.0 c	3.3 c	4.0 c	4.7 d	4.3 c				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	7.0 a	6.0 ab	6.3 a	6.0 a	6.3 ab	7.0 a				
12	CHECK UNTREATED			Fall	6.7 a	6.7 a	6.3 a	6.0 a	7.0 a	7.0 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006

** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.

*** Cells highlighted in gray represent dates in which no data was taken.

**** Values within a column and timing followed by the same letter are not significantly different. LSD $P=0.05$.

'Gallery' perennial ryegrass had the highest color ratings with mesotrione impregnated fertilizers EXC 867-869 in the summer. All mesotrione impregnated fertilizer treatments had higher color ratings than the untreated check in the summer. In the fall there was no one treatment that consistently provided the highest or lowest color rating. At 1 and 2 WAT, EXC 869 had the lowest color rating, while all other treatments were not different. At 3-5 WAT there was no single treatment with the highest or lowest color rating, but at 6 WAT the siduron impregnated fertilizer EXC 926 had the lowest color rating (Table 18).

Table 18. Turfgrass color of 'Gallery' perennial ryegrass in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Turfgrass Color (1-9;9=dark green)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	5.7 a ****	7.0 ab	7.0 ab	5.7 c	5.7 abc	6.3 a	6.3 a	6.3 a	6.7 a
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		6.0 a	7.7 a	8.0 a	7.0 ab	6.7 a	6.3 a	6.0 a	6.0 a	6.0 a
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		6.3 a	7.3 ab	7.7 a	6.0 bc	6.3 ab	6.0 a	6.3 a	6.3 a	6.3 a
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		6.3 a	7.7 a	7.3 a	7.3 a	6.7 a	6.3 a	5.7 ab	5.7 ab	6.0 a
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		5.7 a	5.7 bc	6.0 b	5.3 cd	5.3 bc	5.3 ab	5.0 ab	5.0 ab	5.7 ab
6	CHECK UNTREATED			Summer		4.3 b	5.0 c	4.7 c	4.3 d	4.7 c	4.3 b	4.3 b	4.3 b	4.7 b
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	7.0 a	7.0 a	6.0 ab	5.7 abc	5.3 a	5.7 b	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	6.7 a	6.3 a	5.7 b	5.0 bc	5.3 a	5.7 b				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	6.7 a	6.3 a	7.0 a	6.7 a	6.7 a	6.7 a				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	4.7 b	4.3 b	6.3 ab	5.0 bc	5.3 a	5.7 b				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	6.3 a	6.3 a	6.3 ab	4.7 c	5.0 a	4.7 c				
12	CHECK UNTREATED			Fall	7.0 a	7.0 a	7.0 a	6.0 ab	5.7 a	6.0 ab				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006
** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD *P*=0.05.

'NuDestiny' Kentucky bluegrass had the highest color ratings when using mesotrione impregnated fertilizers EXC 867 and 869, while the lowest color rating was typically associated with siduron impregnated fertilizer EXC 926 (Table 19). In the fall trial there were significant differences in turfgrass color at 1, 2, and 4 WAT. A decrease in color when compared to the untreated check was apparent for mesotrione impregnated fertilizers EXC 866, 867, 869 and siduron impregnated fertilizer EXC 926 at 1 WAT. Mesotrione impregnated fertilizers EXC 868 and 869 had lower color ratings than the untreated check at 2 WAT, and all impregnated fertilizer treatments had lower turfgrass color ratings at 4 WAT.

Table 19. Turfgrass color of 'NuDestiny' Kentucky bluegrass in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/ AI Rate GA/HA	Applic. Code *	Timing	Turfgrass Color (1-9;9=dark green)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***		5.3 ab ****	5.7 ab	6.3 a	6.3 abc	5.0 b	6.3 abc	6.3 abc	6.3 abc
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer			5.3 ab	6.0 a	5.7 a	6.7 ab	6.0 a	6.7 ab	6.7 ab	6.7 ab
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer			5.3 ab	5.3 ab	5.7 a	5.7 bc	5.3 ab	5.7 bc	6.0 bcd	6.0 bc
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer			5.7 a	6.0 a	6.0 a	7.3 a	6.0 a	7.3 a	7.0 a	7.0 a
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer			5.3 ab	5.7 ab	6.0 a	5.7 bc	5.0 ab	5.7 bc	5.7 cd	5.7 c
6	CHECK UNTREATED			Summer			4.3 b	4.7 b	4.3 b	5.3 c	4.7 b	5.3 c	5.3 d	5.7 c
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	5.0 c	6.0 ab	6.0 a	5.3 b	5.0 a	5.0 a	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	5.3 bc	5.7 abc	5.7 a	5.0 b	5.0 a	5.0 a				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	5.7 ab	5.3 bc	5.7 a	5.0 b	5.0 a	5.0 a				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	5.0 c	5.0 c	5.7 a	5.0 b	5.7 a	5.7 a				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	5.0 c	6.0 ab	5.3 a	5.3 b	5.3 a	5.7 a				
12	CHECK UNTREATED			Fall	6.0 a	6.3 a	6.0 a	6.0 a	5.7 a	5.7 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006
** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD *P* =0.05.

'Inferno' tall fescue had the highest color rating in combination with mesotrione impregnated fertilizer EXC 868 in the summer and with mesotrione impregnated fertilizer EXC 866 in the fall. The lowest color rating in the summer was in combination with siduron impregnated fertilizer EXC 926 and in the fall was with mesotrione impregnated fertilizer EXC 869 (Table 20).

Table 20. Turfgrass color of 'Inferno' tall fescue in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Turfgrass Color (1-9;9=dark green)									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	6.0 ab ****	7.0 a	7.0 a	5.7 a	5.0 abc	5.7 a	5.7 ab	6.0 a	6.0 a
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		5.7 ab	6.0 ab	5.7 bc	6.0 a	5.3 ab	5.7 a	5.7 ab	6.0 a	6.0 a
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		6.3 a	6.7 ab	7.0 a	6.0 a	5.7 a	6.0 a	6.0 ab	6.3 a	6.3 a
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		5.3 bc	5.0 ab	4.7 d	5.7 a	5.0 abc	5.3 ab	6.3 a	6.3 a	6.3 a
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		6.0 ab	6.0 ab	6.3 ab	5.7 a	4.3 bc	5.3 ab	5.7 ab	5.7 ab	6.0 a
6	CHECK UNTREATED			Summer		4.7 c	4.7 b	5.0 cd	4.7 a	4.0 c	4.3 b	4.3 b	4.3 b	4.0 b
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	6.0 a	6.7 ab	6.7 ab	6.7 b	6.0 ab	6.0 b	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	5.3 ab	5.3 c	6.0 b	6.3 bc	6.0 ab	6.0 b				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	5.0 ab	5.3 c	6.3 ab	6.0 c	6.0 ab	6.0 b				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	4.7 b	5.7 bc	6.0 b	6.0 c	5.7 b	5.3 c				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	5.3 ab	5.7 bc	6.0 b	6.3 bc	6.3 ab	6.0 b				
12	CHECK UNTREATED			Fall	6.0 a	7.0 a	7.3 a	7.3 a	6.7 a	7.0 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006
** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD *P* =0.05.

Turfgrass Cover:

Overall, mesotrione impregnated fertilizer EXC 869 usually had the lowest percent turfgrass cover across all species in the summer and fall trials (Tables 21-24 and Figures 4-6). Trends for other treatments were not consistent across species and trials, and will be discussed individually.

'Treasure' chewings fescue had the highest percent cover in both the summer and fall with siduron impregnated fertilizer EXC 926, and the lowest percent cover with mesotrione impregnated fertilizer EXC 869 in both the summer and fall. When compared to the untreated check, all mesotrione impregnated fertilizer treatments reduced turfgrass cover through 5 WAT, but were not different from 6-10 WAT. In the fall trial, all mesotrione impregnated fertilizer treatments reduced turfgrass cover when compared to the check from 2 WAT to the end of the study, except for EXC 866 at 5 WAT (Table 21 and Figure 4).

Table 21. Percent turfgrass cover of 'Treasure' chewings fescue in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Percent Turfgrass Cover									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	30.0 b ****	30.0 b	33.3 c	33.3 bc	43.3 b	65.0 b	85.7 ab	86.7 ab	88.7 b
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		25.0 bc	25.0 bc	28.3 cd	38.3 b	48.3 b	68.3 b	86.7 ab	88.3 ab	88.3 ab
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		20.0 bc	20.0 bc	23.3 cd	25.0 bc	31.7 b	60.0 b	85.0 ab	88.3 ab	89.3 ab
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		13.3 c	13.3 c	18.3 d	11.7 c	28.3 b	53.3 b	76.7 c	81.7 b	83.3 b
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		66.7 a	66.7 a	71.7 a	71.7 a	75.0 a	85.0 a	92.7 a	92.7 a	94.3 a
6	CHECK UNTREATED			Summer		53.3 a	53.3 a	56.7 b	38.3 b	48.3 b	68.3 b	83.3 bc	85.0 b	85.7 b
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	5.0 a	10.0 bc	16.7 b	46.7 b	55.0 a	61.7 b	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	5.0 a	9.0 bc	13.0 c	36.7 bc	40.0 b	48.3 c				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	5.3 a	8.0 c	12.0 c	26.7 c	33.3 b	33.3 d				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	5.0 a	7.0 c	13.0 c	25.0 c	30.0 b	33.3 d				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	7.3 a	11.7 b	20.0 a	46.7 b	53.3 a	60.0 b				
12	CHECK UNTREATED			Fall	7.3 a	16.7 a	21.7 a	60.0 a	63.3 a	75.0 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006
** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD $P=0.05$.

'Gallery' perennial ryegrass responded to the treatments differently than 'Treasure' chewings fescue. In the summer, mesotrione impregnated fertilizer EXC 869 had the lowest percent cover, but all other treatments were approximately equal. There was a significant increase in percent turfgrass cover when compared to the untreated check at 4, 5, 7, and 8 WAT when using EXC 866. EXC 867 also had significantly higher percent turfgrass cover ratings than the untreated check at 4, 5, 8, and 9 WAT. The siduron impregnated fertilizer only differed from the untreated check in percent turfgrass cover at 8 WAT. In the fall trial, no mesotrione impregnated fertilizers differed from the untreated check except for EXC 867 at 4 WAT. The siduron impregnated fertilizer EXC 926 had lower percent turfgrass cover ratings than the untreated check in all weeks, except week 3, in which no treatments differed from the untreated check plot (Table 22 and Figure 6).

Table 22. Percent turfgrass cover of 'Gallery' perennial ryegrass in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Percent Turfgrass Cover									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	58.3 a ****	73.3 a	73.3 a	68.3 a	78.3 a	86.7 a	93.3 a	93.3 ab	93.7 ab
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		58.3 a	68.3 a	73.3 a	70.0 a	76.7 a	85.0 ab	95.0 a	95.0 a	95.0 a
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		56.7 a	66.7 a	68.3 ab	63.3 ab	73.3 a	83.3 ab	94.3 a	94.3 ab	95.0 a
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		40.0 b	48.3 b	51.7 c	58.3 ab	70.0 a	81.7 ab	90.3 b	91.0 c	91.7 b
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		48.3 ab	60.0 ab	61.7 bc	63.3 ab	73.3 a	85.0 ab	93.3 a	94.0 ab	95.0 a
6	CHECK UNTREATED			Summer		50.0 ab	60.0 ab	61.7 bc	53.3 b	68.3 a	76.7 b	90.7 b	92.3 bc	93.3 ab
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	23.3 ab	31.7 ab	55.0 a	70.0 ab	85.0 ab	90.0 ab	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	21.7 ab	28.3 ab	66.7 a	65.0 b	76.7 ab	83.3 ab				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	23.3 ab	26.7 abc	65.0 a	70.0 ab	86.7 ab	91.7 ab				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	20.0 b	25.0 bc	56.7 a	71.7 ab	83.3 ab	86.7 ab				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	13.3 c	20.0 c	60.0 a	65.0 b	75.0 b	81.7 b				
12	CHECK UNTREATED			Fall	26.7 a	33.3 a	61.7 a	76.7 a	90.0 a	93.3 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006
** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD $P=0.05$.

In the 'NuDestiny' Kentucky bluegrass study, it was found that mesotrione impregnated fertilizer EXC 869 reduced turfgrass cover the most in both the summer and fall trials. When compared to the check in the summer trial, the only observed differences for mesotrione impregnated fertilizers were at 3 and 5 WAT. At 3 WAT, EXC 866 and EXC 868 provided higher percent cover than the untreated check; while at 5 WAT EXC 869 provided lower percent cover than the untreated check. The siduron impregnated fertilizer EXC 926 had the same percent cover as the untreated check during all weeks in the summer trial. In the fall, all mesotrione impregnated fertilizer treatments had lower percent cover ratings than the untreated check from 2-6 WAT, except for EXC 866 at 3 WAT. The siduron impregnated fertilizer had lower percent cover ratings than the untreated check from week 3 to the end of the fall trial (Table 23 and Figure 5).

Table 23. Percent turfgrass cover of 'NuDestiny' Kentucky bluegrass in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Percent Turfgrass Cover									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***		10.0 a ****	50.0 a	55.0 a	55.0 ab	70.0 ab	55.0 ab	56.7 ab	65.0 ab
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer			8.3 ab	40.0 ab	48.3 ab	56.7 ab	66.7 ab	56.7 ab	63.3 ab	70.0 ab
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer			10.0 a	50.0 a	53.3 a	61.7 a	76.7 a	61.7 a	66.7 a	71.7 a
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer			5.7 b	25.0 b	28.3 c	45.0 b	58.3 b	45.0 b	53.3 b	58.3 b
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer			7.3 ab	33.3 ab	38.3 bc	45.0 b	63.3 ab	45.0 b	51.7 b	60.0 ab
6	CHECK UNTREATED			Summer			7.0 b	41.7 ab	45.0 ab	48.3 ab	63.3 ab	48.3 ab	55.0 ab	63.3 ab
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	5.0 a	11.7 b	19.0 ab	45.0 b	53.3 b	58.3 b	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	5.0 a	11.7 b	16.7 bc	41.7 b	46.7 c	51.7 c				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	5.0 a	10.0 b	16.7 bc	41.7 b	50.0 bc	53.3 c				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	5.0 a	10.0 b	15.0 c	40.0 b	46.7 c	51.7 c				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	5.0 a	16.7 a	18.3 b	45.0 b	48.3 bc	55.0 bc				
12	CHECK UNTREATED			Fall	5.0 a	18.3 a	21.7 a	55.0 a	61.7 a	66.7 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006
** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD *P* =0.05.

'Inferno' tall fescue percent turfgrass cover, when compared to the untreated check in the summer trial, was reduced only in week 2 when using EXC 869. At 3 and 4 WAT, EXC 868 increased turfgrass cover when compared to the untreated check. From 5-7 WAT mesotrione impregnated fertilizers EXC 868 and 869 had more turfgrass cover than the untreated check, while only EXC 869 had higher percent turfgrass cover at 8 WAT. During weeks 9 and 10, all impregnated fertilizer treatments had a higher percent of turfgrass cover than the untreated check plot. In the fall trial, all mesotrione impregnated fertilizers had lower percent turfgrass cover ratings at 1 and 2 WAT except EXC 869 at 1 WAT. From 3-6 WAT, mesotrione impregnated fertilizers EXC 866, 867, and 868 were not different from the untreated check. Mesotrione impregnated fertilizer EXC 869 had less turfgrass cover than the untreated check from week 3 to the end of the study (Table 24).

Table 24. Percent turfgrass cover of 'Inferno' tall fescue in response to applications of mesotrione and siduron impregnated fertilizers at planting.

Trt. #	Treatment/ Product Name	Product/AI Rate GA/HA	Applic. Code *	Timing	Percent Turfgrass Cover									
					1 WAT	2 WAT	3 WAT	4 WAT	5 WAT	6 WAT **	7 WAT	8 WAT	9 WAT	10 WAT
1	EXC866 0.083 GR (20-27-5)	161	AB	Summer	***	20.0 a ****	50.0 bc	55.0 b	53.3 bc	63.3 bc	76.7 ab	86.0 ab	91.0 a	91.7 b
2	EXC867 0.139 GR (20-27-5)	282	AB	Summer		20.0 a	51.7 abc	55.0 b	56.7 ab	66.7 abc	78.3 ab	90.0 ab	93.3 a	94.3 ab
3	EXC868 0.167 GR (20-27-5)	343	AB	Summer		21.7 a	60.0 a	65.0 a	65.0 a	73.3 a	81.7 a	90.0 ab	91.0 a	95.0 a
4	EXC869 0.278 GR (20-27-5)	565	AB	Summer		13.3 b	43.3 c	48.3 b	60.0 ab	73.3 a	83.3 a	92.7 a	93.3 a	94.3 ab
5	EXC926 3.1 GR (18-23-4)	6700	AB	Summer		21.7 a	53.3 ab	56.7 ab	61.7 ab	71.7 ab	78.3 ab	89.3 ab	92.3 a	93.3 ab
6	CHECK UNTREATED			Summer		20.0 a	48.3 bc	53.3 b	46.7 c	58.3 c	71.7 b	83.3 b	85.0 b	88.3 c
7	EXC866 0.083 GR (20-27-5)	161	C	Fall	10.0 b	41.7 b	53.3 a	60.0 a	56.7 a	65.0 ab	***			
8	EXC867 0.139 GR (20-27-5)	282	C	Fall	10.7 b	40.0 bc	46.7 ab	51.7 bc	55.0 a	63.3 ab				
9	EXC868 0.167 GR (20-27-5)	343	C	Fall	10.0 b	41.7 b	50.0 a	55.0 abc	60.0 a	63.3 ab				
10	EXC869 0.278 GR (20-27-5)	565	C	Fall	11.0 ab	33.3 d	41.7 b	48.3 c	50.0 a	56.7 b				
11	EXC926 3.1 GR (18-23-4)	6700	C	Fall	11.0 ab	36.7 cd	41.7 b	48.3 c	53.3 a	61.7 ab				
12	CHECK UNTREATED			Fall	13.7 a	46.7 a	53.3 a	58.3 ab	58.3 a	66.7 a				

* Application dates: A= 6/8/2006, B= 7/20/2006, C= 9/1/2006
** Ratings taken 6 weeks after treatment (6 WAT) were taken on 7/22/2006, two days after the second herbicide application.
*** Cells highlighted in gray represent dates in which no data was taken.
**** Values within a column and timing followed by the same letter are not significantly different. LSD *P* =0.05.

Conclusions

The objectives of this study were to: (1) determine if mesotrione was safe to use on different turfgrass species when applied with a fertilizer at seeding, (2) determine which rate of mesotrione provided the best (>85%) weed control, (3) determine if both grass and broadleaf weeds were controlled, and (4) determine if both summer and fall applications are safe.

Mesotrione impregnated fertilizer EXC 866 was safe to all turfgrass species in both the summer and the fall, with the exception of 'Treasure' chewings fescue in the summer at 3 WAT. Mesotrione impregnated fertilizers EXC 867-869 were not safe on 'Treasure' chewings fescue in the summer or fall trials. Mesotrione impregnated fertilizers EXC 866-867 were safe on 'Gallery' perennial ryegrass in the summer and fall, however EXC 869 was not. All mesotrione treatments were always safe on 'NuDestiny' Kentucky bluegrass, except EXC 869 at 4 WAT in the summer. Mesotrione impregnated fertilizers EXC 866-868 were safe in both the summer and fall trials when applied on 'Inferno' tall fescue, but EXC 869 was not.

Generally, mesotrione impregnated fertilizer EXC 868 and 869 provided the highest level of weed control across species, but were variable within each species and trial timing. All rates of mesotrione appeared to control broadleaf weeds. For the most part, mesotrione impregnated fertilizer EXC 869 showed significant injury. Mesotrione was not effective in the control of the grass weeds in our region (Figure 2).

Figure 1. Location of summer and fall research plots.

Figure 2. Mesotrione injury to Witchgrass (*Panicum capillare*) at 565 g ai/ha, summer, 7 WAT (1 week after second application).

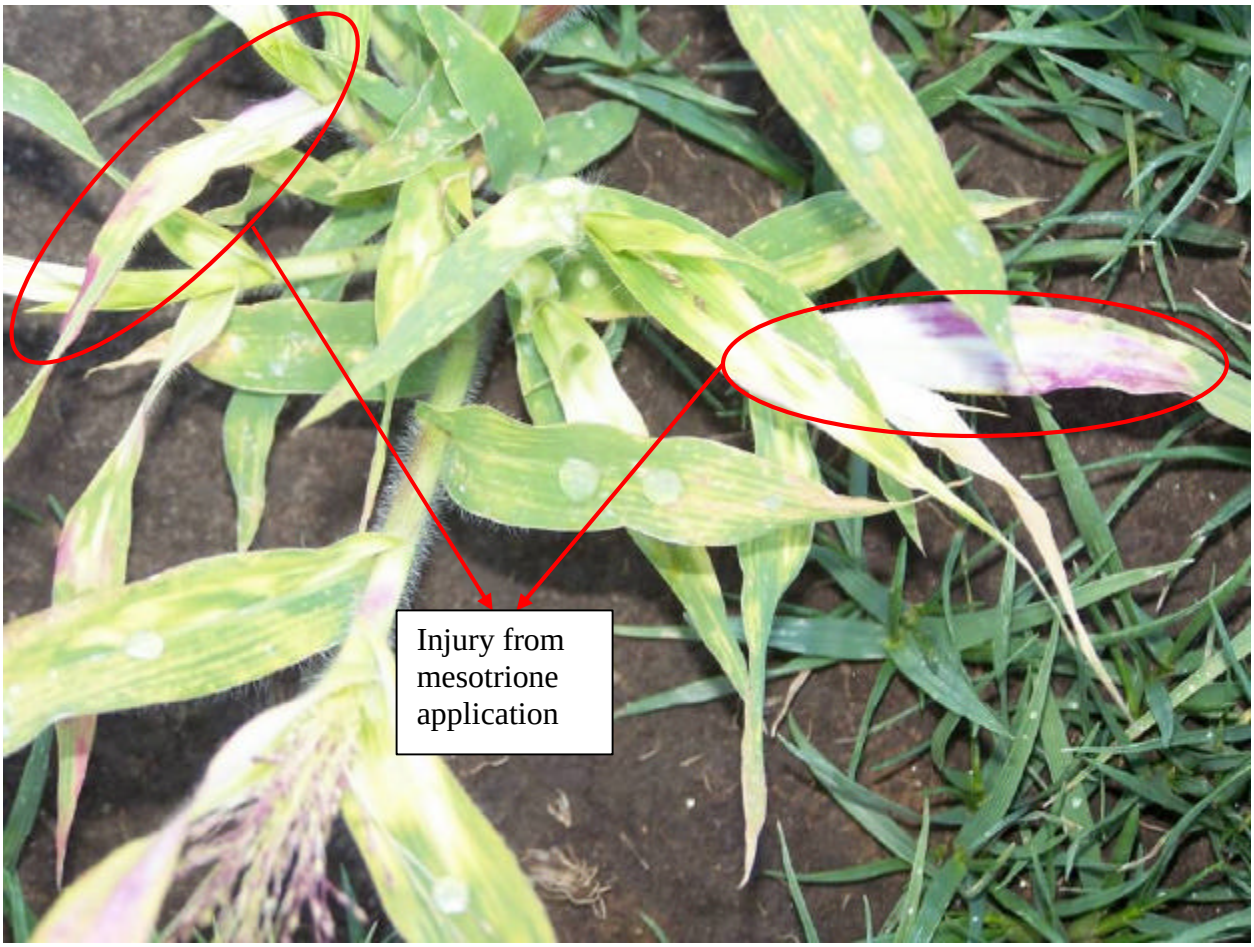

Figure 3. Phytotoxicity to 'Treasure' chewings fescue at 343 g ai/ha, summer, 1 week after first treatment.

Figure 4. Comparison of percent cover and total weed number for 'Treasure' chewings fescue, summer, 5 weeks after first treatment.

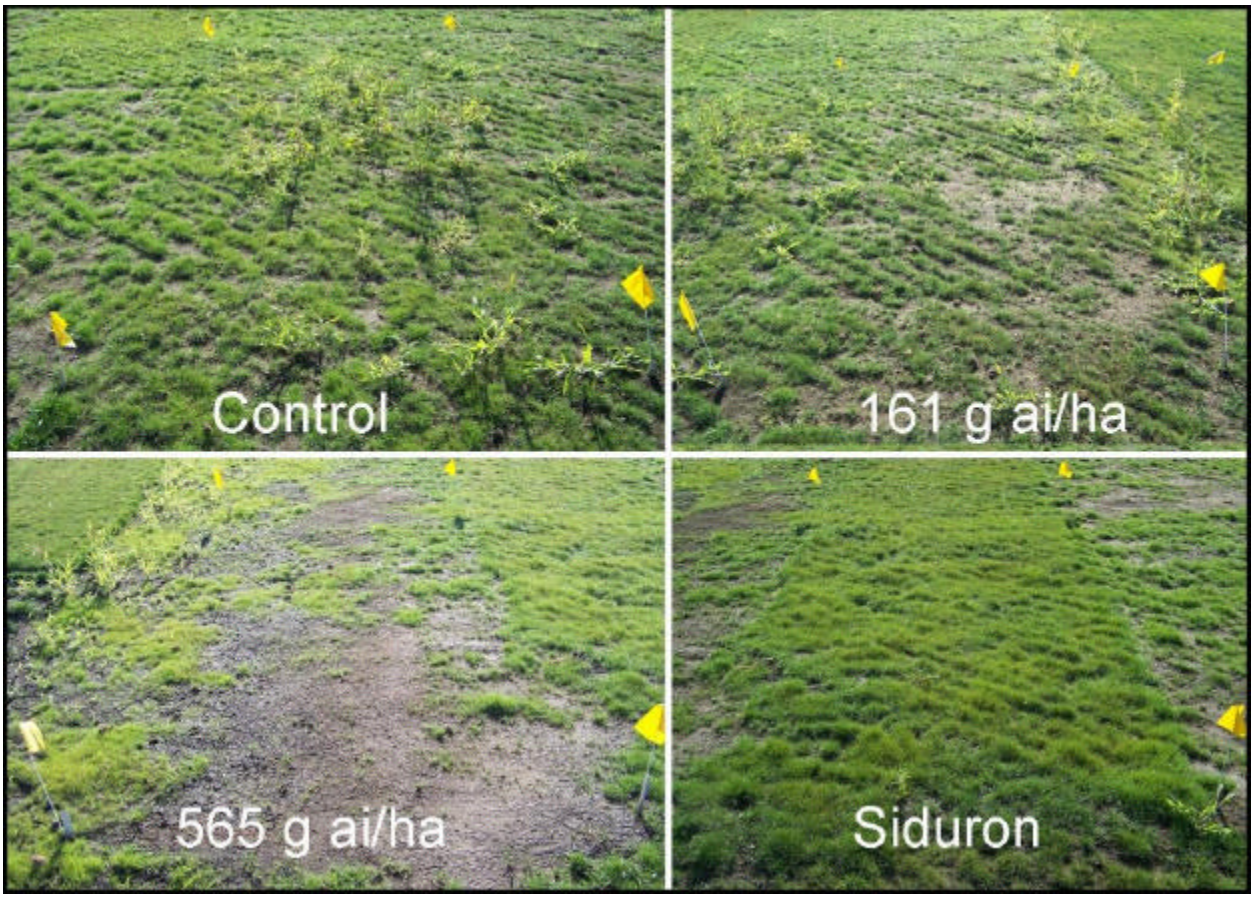

Figure 5. Comparison of percent cover and total weed number for 'NuDestiny' Kentucky bluegrass, summer, 5 weeks after first treatment.

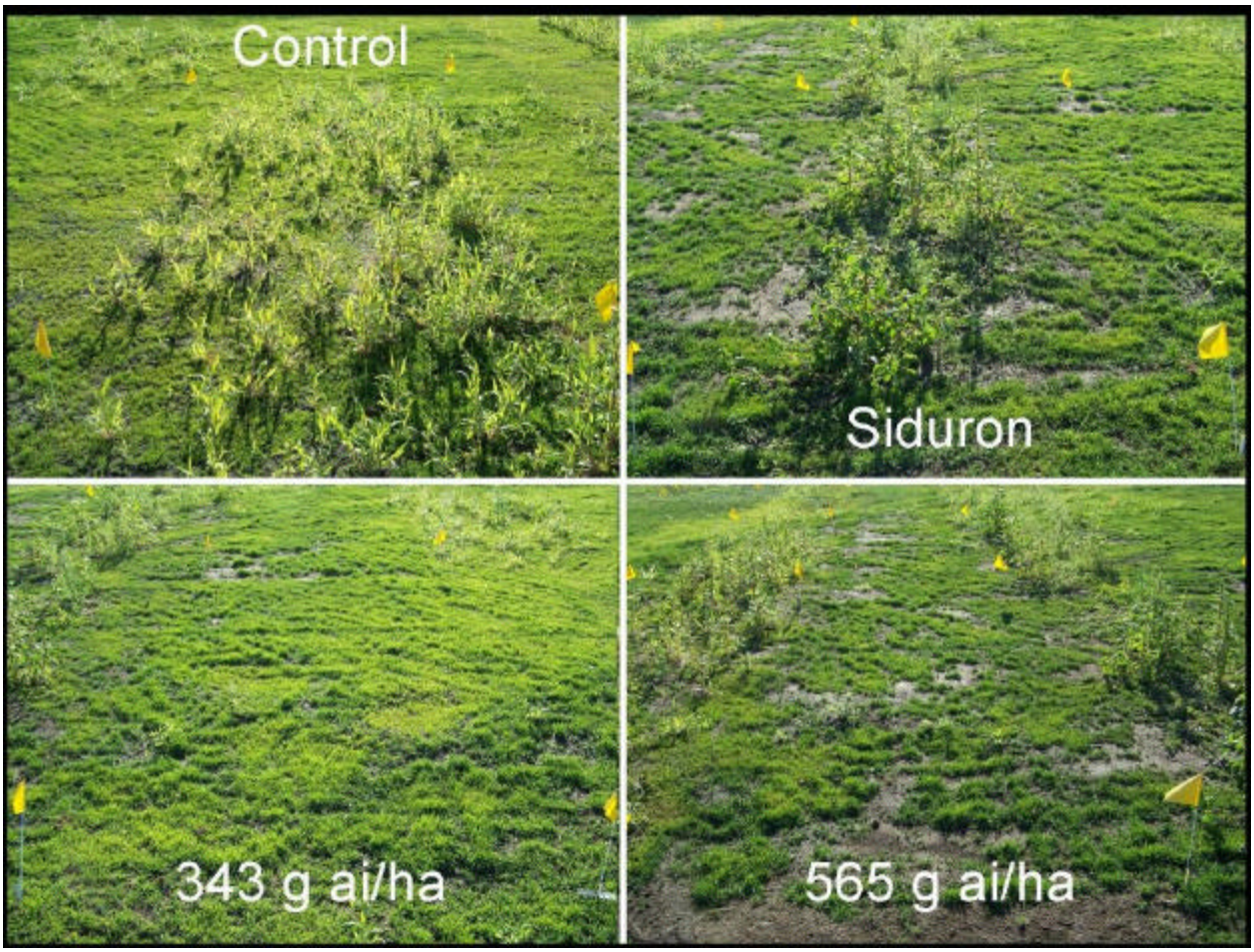

Figure 6. Comparison of percent cover and total weed number for 'Gallery' perennial ryegrass, summer, 7 weeks after first treatment (1 week after second application).