2018 Cable Barrier Bareground Trial in Louisville (including 2019 assessment)

Introduction

Median cable barriers are designed to protect drivers from crossover accidents on interstates and highways. However, the vegetation under and adjacent to them must be managed for safety and aesthetics. Usually, this means using herbicides to maintain a vegetation free (bare ground) zone underneath the barriers. Broad-spectrum soil applied preemergence residual herbicides, in combination with a broad-spectrum post emergence herbicide like glyphosate, are the mainstay for maintaining these bare ground zones. However, there may be turf adjacent to the bare ground zone that should be maintained. Ideally, the residual herbicides will last all season long (even into early the next spring) and not move off-site by leaching or erosion (movement of soil particles with adsorbed herbicide).

This trial was part of an ongoing effort to evaluate the vegetation control efficacy and desirable turf damage potential of a range of herbicide options when used for vegetation management under cable barriers.

Materials and Methods

The trial was established in the median of I-265 in Louisville, KY under and beside a cable barrier with a mixed stand of turf species. The 18 herbicide treatments and 3 replications were arranged in a randomized complete block design. Treatments were applied at 25 gallons per acre onto 6.5 ft wide by 20 ft long plots on May 23, 2018. All treatments, except Roundup ProMax alone (Treatment 1) included Activator 90 non-ionic surfactant at 0.25% v/v (Table 1a and 1b). Roundup ProMax (glyphosate) has no residual activity so other herbicides were included in the combination treatments to provide residual and pre-emergent control for the bare ground treatments. Different herbicide combinations also broadened the weed spectrum controlled and reduced the risk of developing problems with resistant weeds by using different Mechanisms of Action (MOA) groups (Table 1a and 1b). The trial included treatments which have been long term “standards” as well as newer products and combinations currently being used in KY. New treatments this year included Detail (saflufenacil) (Treatment 16) and one without glyphosate designed to control broadleaf weeds and suppressing grass growth behind guardrails (Treatment 17). Detail may be useful in areas with sensitive crops nearby as it is less likely to move off-target due to volatility but can be less persistent than other herbicides. It should be noted that the label recommends the use of MSO for accelerated burndown at 2 fl oz/ac in combination with glyphosate, however, Treatment 16 was applied with a non-ionic surfactant. The label also recommends the 6 fl oz/ac rate for residual control. This treatment combination will be included in next year’s trial.

The Louisville weather station reported 0.53 inches of rain over May 27 and 28 which should have activated the soil residual herbicide treatments. Additional rainfall was recorded from May 29 to June 1 (1.75 inches). These rainfall events may have contributed to the movement of some herbicide treatments from their application site and damaged adjacent turf (Figures 1 to 5). Species present at application included flowering Buckhorn plantain (7 inch canopy), flowering

tall fescue (24 inches to seedhead) plus Kentucky bluegrass which had mature seed heads (20 inches to seedhead).

Visual ratings of the proportion (%) of bare ground cover were taken 41 days after treatment (DAT) (7/3/2018) along with a rating of the extent of turf damage beyond the initial spray pattern, ranging from 0 (none) to 3 (severe). Visual assessments of the proportion (%) of bare ground, perennial grasses, annual grasses, and broadleaf weeds were taken 72 DAT (8/3/2018), 119 DAT (9/19/2018), and 153 DAT (10/23/2018) DAT. The last rating in 2018 was done after a hard freeze when many of the annual broadleaf plants, such as prostrate spurge, were killed. The last evaluation for this trial was conducted in the spring of 2019, 342 DAT (4/30/2019). Data were analyzed using ARM research management software (GDM Solutions, Inc.) and treatment means were compared using Fisher's LSD at $p = 0.05$.

Results and Discussion

All treatments with glyphosate (Treatments 1 to 16) had more bareground (35 to 100%) than those that did not (Treatments 17 and 18) (3 to 12%) 41 DAT (Tables 2a and 2b). Most of the treatments with soil active herbicides were in the top grouping (Treatments 2 to 14) (83 to 100%) except for Treatments 15 and 16 (35 to 75%). A number of treatments had turf damage [>0.5 to <2.0] consistent with movement of herbicides beyond the initial spray pattern (Tables 2a and 2b). Treatments with similar damage ratings included Sahara (Treatment 2), Hyvar (Treatment 3), Oust XP (Treatments 4 and 9), Perspective + Proclipse (Treatment 6), Streamline + Esplanade + Plateau (Treatment 10), and two treatments with imazapyr (Treatments 7and 8).

While most of the trial site had a mix of tall fescue and Kentucky bluegrass there were areas with fine fescues and bermudagrass. Their non-uniform distribution increased the plot by plot variability with some treatments. By 72 DAT some treatments had less bareground as perennial grasses recovered, annual grasses (mostly yellow foxtail), and broadleaves (mostly prostrate spurge) colonized the space (Tables 3a and 3b). Treatments in the top group for bareground (70 to 98%) included Sahara (Treatment 2), Hyvar (Treatment 3), Perspective + Proclipse (Treatment 6), Viewpoint + Esplanade (Treatment 7), AC Polaris Complete (Treatment 8), Esplanade + Oust (Treatment 9), Streamline + Esplanade + Plateau (Treatment 10), Method + Esplanade (Treatment 13) and Milestone + Esplanade (Treatment 14). Treatments with the lowest percentage of bareground were not different from control (2 to 13%) and included Roundup ProMax by itself (Treatment 1), Detail (Treatment 16), and Method + Plateau (Treatment 17). This last treatment did not have glyphosate applied and had the greatest perennial grass cover.

Later in the season (119 DAT) a greater percentage of annual grass and broadleaf cover was observed in more treatments. Treatments in the top group with high % bareground (58 to 85%) included Hyvar (Treatment 3), Viewpoint + Esplanade (Treatment 7), Oust + Esplanade (Treatment 9), Streamline + Esplanade + Plateau (Treatment 10), Method + Esplanade (Treatment 13), and Milestone + Esplanade (Treatment 14) (Tables 4a and 4b). Most the other treatments were not different from control (0 to 33%) except for Esplanade + Oust Extra (Treatment 15) (42%). Control plots were dominated by annual teff grass (90% cover). Detail (Treatment 16) had removed most of the perennial grass and had the most yellow foxtail cover

(43%) in the trial. The Cleantraxx treatments (11 and 12) did not have as much foxtail but did have the most prostrate spurge cover (69 to 72%) in the trial.

The last assessment in 2018, 153 DAT, was done after a hard freeze and many of the annuals were killed. The treatments with the greatest amount of bareground (60 to 88%) were the same as at the previous rating with the addition of the Cleantraxx treatments (11 and 12) after the natural death of much of the spurge cover (Tables 5a and 5b).

The last assessment for the trial was conducted in spring 2019, 342 DAT (Figure 6). Most of the herbicide treatments still displayed 42 to 73% bareground (Tables 6a and 6b). Treatments with the least bareground (0 to 30%) and similar to the control treatment included Oust (Treatment 4), Perspective + Esplanade (Treatment 5), Perspective + Proclipse (Treatment 6), Esplanade + Oust Extra (Treatment 15), Detail (Treatment 16), and the treatment without glyphosate (Method + Plateau) (Treatment 17). The treatments with the most grass cover (60 to 88%) were those without glyphosate, Method + Plateau (Treatment 17) and control (Treatment 18).

The vegetation under the cable barrier at this location gave a good test of how well some of these bare ground herbicides can perform over a season and into the next year (Figure 7). These trials will continue to provide information for roadside managers.

Table 1a. Herbicide Treatments, Active Ingredients, Application Rates, and Mechanism of Action (MOA) Groups for Cable Barrier Bareground Trial. (Part 1 of 2)

Trt. No.	Product Name*	Rate	Rate Unit	Active Ingredient(s)	ai Rate (per acre)	MOA Groups
1	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE	9
2	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE	9
	Sahara	10	LB/A	diuron + imazapyr	6.2 LB + 12.4 OZ	7 + 2
3	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE	9
	Hyvar	10	LB/A	bromacil	8 LB	5
4	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE	9
	Oust XP	3	OZ/A	sulfometuron	2.3 OZ	2
5	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE	9
	Perspective	9	OZ/A	aminocyclopyrachlor + chlorsulfuron	3.6 OZ + 1.4 OZ	4 + 2
	Esplanade	3.5	FL OZ/A	indaziflam	0.7 OZ	29
6	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE	9
	Perspective	9	OZ/A	aminocyclopyrachlor + chlorsulfuron	3.6 OZ + 1.4 OZ	4 + 2
	Proclipse	2.3	LB/A	prodiamine	1.5 LB	3
7	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE	9
	Viewpoint	18	OZ/A	aminocyclopyrachlor + imazapyr + metsulfuron	4.1 OZ + 5.7 OZ + 1.3 OZ	4 + 2 + 2
	Esplanade	3.5	FL OZ/A	indaziflam	0.7 OZ	29
8	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE	9
	Polaris AC Complete	2	PT/A	imazapyr	16 OZ AE	2
9	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE	9
	Esplanade	3.5	FL OZ/A	indaziflam	0.7 OZ	29
	Oust XP	3	OZ/A	sulfometuron	2.3 OZ	2
10	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE	9
	Streamline	8	OZ/A	aminocyclopyrachlor + metsulfuron	3.2 OZ + 1 OZ	4 + 2
	Esplanade	5	FL OZ/A	indaziflam	1 OZ	29
	Plateau	5	FL OZ/A	imazapic	1.3 OZ AE	2
11	Rodeo	1.5	QT/A	glyphosate	1.5 LB AE	9
	Cleantraxx	3	PT/A	penoxsulam + oxyfluorfen	0.5 OZ + 23.6 OZ	2 + 14
	Milestone VM	7	FL OZ/A	aminopyralid	1.8 OZ AE	4
12	Rodeo	1.5	QT/A	glyphosate	1.5 LB AE	9
	Cleantraxx	4.5	PT/A	penoxsulam + oxyfluorfen	0.7 OZ + 35.4 OZ	2 + 14

*All herbicide treatments (except trt. #1) contained the adjuvant, Activator 90 at 0.25% v/v.

Table 1b. Herbicide Treatments, Active Ingredients, Application Rates, and Mechanism of Action (MOA) Groups for Cable Barrier Bareground Trial (Part 2 of 2)

Trt. No.	Product Name*	Rate	Rate Unit	Active Ingredient(s)	ai Rate (per acre)	MOA Groups
13	Rodeo	1.5	QT/A	glyphosate	1.5 LB AE	9
	Method	12	FL OZ/A	aminocyclopyrachlor	3 OZ AE	4
	Esplanade	5	FL OZ/A	indaziflam	1 OZ	29
14	Rodeo	1.5	QT/A	glyphosate	1.5 LB AE	9
	Esplanade	6	FL OZ/A	indaziflam	1.3 OZ	29
	Milestone VM	7	FL OZ/A	aminopyralid	1.8 OZ AE	4
15	Rodeo	1.5	QT/A	glyphosate	1.5 LB AE	9
	Esplanade	3.5	FL OZ/A	indaziflam	0.7 OZ	29
	Oust Extra	1.5	OZ/A	sulfometuron + metsulfuron	0.8 OZ + 0.2 OZ	2 + 2
16	Rodeo	1.5	QT/A	glyphosate	1.5 LB AE	9
	Detail	2	FL OZ/A	saflufenacil	0.7 OZ	14
17	Method	12	FL OZ/A	aminocyclopyrachlor	3 OZ AE	4
	Plateau	3	FL OZ/A	imazapic	0.75 OZ AE	2
18	Nontreated Check					

*All herbicide treatments (except trt. #1) contained the adjuvant, Activator 90 at 0.25% v/v.

Table 2a. Results for Cable Barrier Trial 41 DAT[1] (July 3, 2018) (Part 1 of 2)

				% Bareground	Turf Damage (0-3)[3]
Trt. No.	**Product Name***	**Rate**	**ate Unit**	**41 DAT**	
1	Roundup ProMax	1.3	QT/A	70 c[2]	0.0 c
2	Roundup ProMax Sahara	1.3 10	QT/A LB/A	100 a	1.3 ab
3	Roundup ProMax Hyvar	1.3 10	QT/A LB/A	100 a	1.3 ab
4	Roundup ProMax Oust XP	1.3 3	QT/A OZ/A	83 abc	1.0 abc
5	Roundup ProMax Perspective Esplanade	1.3 9 3.5	QT/A OZ/A FL OZ/A	79 abc	0.3 bc
6	Roundup ProMax Perspective Proclipse	1.3 9 2.3	QT/A OZ/A LB/A	94 ab	0.7 abc
7	Roundup ProMax Viewpoint Esplanade	1.3 18 3.5	QT/A OZ/A FL OZ/A	98 a	1.0 abc
8	Roundup ProMax Polaris AC Complete	1.3 2	QT/A PT/A	98 a	1.7 a
9	Roundup ProMax Esplanade Oust XP	1.3 3.5 3	QT/A FL OZ/A OZ/A	99 a	1.7 a
10	Roundup ProMax Streamline Esplanade Plateau	1.3 8 5 5	QT/A OZ/A FL OZ/A FL OZ/A	83 abc	0.7 abc
11	Rodeo Cleantraxx Milestone VM	1.5 3 7	QT/A PT/A FL OZ/A	97 a	0.0 c
12	Rodeo Cleantraxx	1.5 4.5	QT/A PT/A	98 a	0.0 c

*All herbicide treatments (except trt. #1) contained the adjuvant, Activator 90 at 0.25% v/v.

[1] DAT = Days after treatment [2] Means within a column followed by the same letter are not different according to Fisher's LSD at P < 0.05.

[3] Turf damage based on a scale that ranged from 0 (none) to 3 (severe)

Table 2b. Results for Cable Barrier Trial 41 DAT[1] (July 3, 2018) (Part 2 of 2)

				% Bareground	Turf Damage (0-3)[3]
Trt. No.	**Product Name***	**Rate**	**Rate Unit**	**41 DAT**	
13	Rodeo Method Esplanade	1.5 12 5	QT/A FL OZ/A FL OZ/A	91 ab[2]	0.3 bc
14	Rodeo Esplanade Milestone VM	1.5 6 7	QT/A FL OZ/A FL OZ/A	87 abc	0.0 c
15	Rodeo Esplanade Oust Extra	1.5 3.5 1.5	QT/A FL OZ/A OZ/A	75 bc	0.3 bc
16	Rodeo Detail	1.5 2	QT/A FL OZ/A	35 d	0.0 c
17	Method Plateau	12 3	FL OZ/A FL OZ/A	12 e	0.0 c
18	Nontreated Check			3 e	0.0 c

*All herbicide treatments (except trt. #1) contained the adjuvant, Activator 90 at 0.25% v/v.

[1] *DAT = Days after treatment*

[2] *Means within a column followed by the same letter are not different according to Fisher's LSD at P < 0.05.*

[3] *Turf damage based on a scale that ranged from 0 (none) to 3 (severe)*

Table 3a. Results for Cable Barrier Trial 72 DAT[1] (August 3, 2018) (Part 1 of 2)

				% Bareground	% Annual Grass	% Perennial Grass	% Broadleaves	% Spurge
Trt. No.	**Product Name***	**Rate**	**Rate Unit**	**72 DAT**				
1	Roundup ProMax	1.3	QT/A	12 ef[2]	22 c	0 d	65 a	63 a
2	Roundup ProMax Sahara	1.3 10	QT/A LB/A	97 a	1 d	0 d	2 fg	2 f
3	Roundup ProMax Hyvar	1.3 10	QT/A LB/A	98 a	0 d	0 d	1 g	1 f
4	Roundup ProMax Oust XP	1.3 3	QT/A OZ/A	53 bcd	6 d	35 bc	6 fg	5 f
5	Roundup ProMax Perspective Esplanade	1.3 9 3.5	QT/A OZ/A FL OZ/A	49 cd	5 d	45 ab	1 fg	1 f
6	Roundup ProMax Perspective Proclipse	1.3 9 2.3	QT/A OZ/A LB/A	75 abc	7 d	12 cd	6 fg	6 f
7	Roundup ProMax Viewpoint Esplanade	1.3 18 3.5	QT/A OZ/A FL OZ/A	96 a	2 d	0 d	2 fg	2 f
8	Roundup ProMax Polaris AC Complete	1.3 2	QT/A PT/A	70 abc	4 d	0 d	26 de	24 de
9	Roundup ProMax Esplanade Oust XP	1.3 3.5 3	QT/A FL OZ/A OZ/A	93 a	2 d	0 d	5 fg	1 f
10	Roundup ProMax Streamline Esplanade Plateau	1.3 8 5 5	QT/A OZ/A FL OZ/A FL OZ/A	70 abc	2 d	26 bcd	2 fg	2 f
11	Rodeo Cleantraxx Milestone VM	1.5 3 7	QT/A PT/A FL OZ/A	33 de	7 d	0 d	60 ab	60 ab
12	Rodeo Cleantraxx	1.5 4.5	QT/A PT/A	55 bcd	5 d	0 d	40 cd	38 cd

*All herbicide treatments (except trt. #1) contained the adjuvant, Activator 90 at 0.25% v/v.

[1] *DAT = Days after treatment*

[2] *Means within a column followed by the same letter are not different according to Fisher's LSD at P < 0.05.*

Table 3b. Results for Cable Barrier Trial 72 DAT[1] (August 3, 2018) (Part 2 of 2)

				% Bareground	% Annual Grass	% Perennial Grass	% Broadleaves	% Spurge
Trt. No.	**Product Name***	**Rate**	**Rate Unit**	**72 DAT**				
13	Rodeo Method Esplanade	1.5 12 5	QT/A FL OZ/A FL OZ/A	83 ab[2]	3 d	11 cd	3 fg	3 f
14	Rodeo Esplanade Milestone VM	1.5 6 7	QT/A FL OZ/A FL OZ/A	72 abc	4 d	11 cd	12 efg	12 ef
15	Rodeo Esplanade Oust Extra	1.5 3.5 1.5	QT/A FL OZ/A OZ/A	53 bcd	2 d	35 bc	10 fg	5 f
16	Rodeo Detail	1.5 2	QT/A FL OZ/A	8 ef	37 b	8 cd	47 bc	47 bc
17	Method Plateau	12 3	FL OZ/A FL OZ/A	13 ef	7 d	71 a	9 fg	6 f
18	Nontreated Check			2 f	60 a	23 bcd	17 ef	10 ef

*All herbicide treatments (except trt. #1) contained the adjuvant, Activator 90 at 0.25% v/v.

[1] *DAT = Days after treatment*

[2] *Means within a column followed by the same letter are not different according to Fisher's LSD at P < 0.05.*

Table 4a. Results for Cable Barrier Trial 119 DAT[1] (September 19, 2018) (Part 1 of 2)

Trt. No.	Product Name*	Rate	Rate Unit	% Bareground	% Annual Grass	% Yellow Foxtail	% Perennial Grass	% Broadleaves	% Spurge
				119 DAT					
1	Roundup ProMax	1.3	QT/A	5 e[2]	35 c	25 b	0 d	60 ab	28 bcdef
2	Roundup ProMax Sahara	1.3 10	QT/A LB/A	33 bcde	12 def	8 cde	0 d	55 abc	33 bc
3	Roundup ProMax Hyvar	1.3 10	QT/A LB/A	60 abc	6 f	2 de	3 d	30 cde	29 bcde
4	Roundup ProMax Oust XP	1.3 3	QT/A OZ/A	22 de	28 cd	22 bc	37 abcd	13 def	9 cdefg
5	Roundup ProMax Perspective Esplanade	1.3 9 3.5	QT/A OZ/A FL OZ/A	30 cde	12 def	12 bcde	57 ab	2 f	1 g
6	Roundup ProMax Perspective Proclipse	1.3 9 2.3	QT/A OZ/A LB/A	30 cde	25 cde	17 bcde	23 bcd	22 def	22 bcdefg
7	Roundup ProMax Viewpoint Esplanade	1.3 18 3.5	QT/A OZ/A FL OZ/A	85 a	6 f	6 cde	2 d	7 def	7 cdefg
8	Roundup ProMax Polaris AC Complete	1.3 2	QT/A PT/A	20 de	20 cdef	13 bcde	0 d	60 ab	40 b
9	Roundup ProMax Esplanade Oust XP	1.3 3.5 3	QT/A FL OZ/A OZ/A	83 a	7 f	7 cde	0 d	9 def	1 g
10	Roundup ProMax Streamline Esplanade Plateau	1.3 8 5 5	QT/A OZ/A FL OZ/A FL OZ/A	58 abc	6 f	4 de	33 abcd	3 ef	3 efg
11	Rodeo Cleantraxx Milestone VM	1.5 3 7	QT/A PT/A FL OZ/A	9 de	12 def	10 bcde	0 d	78 a	72 a
12	Rodeo Cleantraxx	1.5 4.5	QT/A PT/A	18 de	10 ef	8 cde	0 d	72 a	69 a

*All herbicide treatments (except trt. #1) contained the adjuvant, Activator 90 at 0.25% v/v.

[1] *DAT = Days after treatment*

[2] *Means within a column followed by the same letter are not different according to Fisher's LSD at P < 0.05.*

Table 4b. Results for Cable Barrier Trial 119 DAT[1] (September 19, 2018) (Part 2 of 2)

Trt. No.	Product Name*	Rate	Rate Unit	% Bareground	% Annual Grass	% Yellow Foxtail	% Perennial Grass	% Broadleaves	% Spurge
				119 DAT					
13	Rodeo Method Esplanade	1.5 12 5	QT/A FL OZ/A FL OZ/A	82 a[2]	5 f	2 e	12 cd	2 f	1 g
14	Rodeo Esplanade Milestone VM	1.5 6 7	QT/A FL OZ/A FL OZ/A	67 ab	3 f	1 e	6 cd	24 def	24 bcdefg
15	Rodeo Esplanade Oust Extra	1.5 3.5 1.5	QT/A FL OZ/A OZ/A	42 bcd	6 f	6 cde	43 abc	11 def	2 fg
16	Rodeo Detail	1.5 2	QT/A FL OZ/A	5 e	53 b	43 a	8 cd	33 bcd	32 bcd
17	Method Plateau	12 3	FL OZ/A FL OZ/A	3 e	20 cdef	8 cde	70 a	7 def	6 defg
18	Nontreated Check			0 e	90 a	18 bcd	3 d	7 def	7 cdefg

*All herbicide treatments (except trt. #1) contained the adjuvant, Activator 90 at 0.25% v/v.

[1] DAT = Days after treatment

[2] Means within a column followed by the same letter are not different according to Fisher's LSD at P < 0.05.

Table 5a. Results for Cable Barrier Trial 153 DAT[1] (October 23, 2018) (Part 1 of 2)

				% Bareground	% Annual Grass	% Perennial Grass	% Broadleaves
Trt. No.	**Product Name***	**Rate**	**Rate Unit**	**153 DAT**			
1	Roundup ProMax	1.3	QT/A	38 bcde[2]	50 b	0 d	12 cd
2	Roundup ProMax Sahara	1.3 10	QT/A LB/A	38 bcde	12 cd	0 d	50 ab
3	Roundup ProMax Hyvar	1.3 10	QT/A LB/A	63 ab	8 cd	7 d	22 bcd
4	Roundup ProMax Oust XP	1.3 3	QT/A OZ/A	18 def	8 cd	52 ab	22 bcd
5	Roundup ProMax Perspective Esplanade	1.3 9 3.5	QT/A OZ/A FL OZ/A	28 bcdef	7 cd	58 ab	3 d
6	Roundup ProMax Perspective Proclipse	1.3 9 2.3	QT/A OZ/A LB/A	35 bcdef	17 cd	28 bcd	20 cd
7	Roundup ProMax Viewpoint Esplanade	1.3 18 3.5	QT/A OZ/A FL OZ/A	83 a	8 cd	5 d	3 d
8	Roundup ProMax Polaris AC Complete	1.3 2	QT/A PT/A	22 cdef	24 c	0 d	54 a
9	Roundup ProMax Esplanade Oust XP	1.3 3.5 3	QT/A FL OZ/A OZ/A	83 a	7 cd	1 d	9 cd
10	Roundup ProMax Streamline Esplanade Plateau	1.3 8 5 5	QT/A OZ/A FL OZ/A FL OZ/A	58 abc	6 cd	33 bcd	2 d
11	Rodeo Cleantraxx Milestone VM	1.5 3 7	QT/A PT/A FL OZ/A	82 a	4 cd	2 d	12 cd
12	Rodeo Cleantraxx	1.5 4.5	QT/A PT/A	60 ab	3 d	1 d	37 abc

*All herbicide treatments (except trt. #1) contained the adjuvant, Activator 90 at 0.25% v/v.

[1] *DAT = Days after treatment*

[2] *Means within a column followed by the same letter are not different according to Fisher's LSD at P < 0.05.*

Table 5b. Results for Cable Barrier Trial 153 DAT[1] (October 23, 2018) (Part 2 of 2)

Trt. No.	Product Name*	Rate	Rate Unit	% Bareground	% Annual Grass	% Perennial Grass	% Broadleaves
				153 DAT			
13	Rodeo	1.5	QT/A	85 a[2]	3 d	10 cd	2 d
	Method	12	FL OZ/A				
	Esplanade	5	FL OZ/A				
14	Rodeo	1.5	QT/A	85 a	5 cd	10 cd	0 d
	Esplanade	6	FL OZ/A				
	Milestone VM	7	FL OZ/A				
15	Rodeo	1.5	QT/A	40 bcd	3 d	51 abc	6 d
	Esplanade	3.5	FL OZ/A				
	Oust Extra	1.5	OZ/A				
16	Rodeo	1.5	QT/A	15 def	52 b	22 bcd	12 cd
	Detail	2	FL OZ/A				
17	Method	12	FL OZ/A	2 ef	13 cd	84 a	1 d
	Plateau	3	FL OZ/A				
18	Nontreated Check			0 f	88 a	2 d	10 cd

*All herbicide treatments (except trt. #1) contained the adjuvant, Activator 90 at 0.25% v/v.

[1] DAT = Days after treatment

[2] Means within a column followed by the same letter are not different according to Fisher's LSD at P < 0.05.

Table 6a. Results for Cable Barrier Trial 342 DAT[1] (April 30, 2019) (Part 1 of 2)

				% Bareground	% Grass	% Broadleaves
Trt. No.	**Product Name***	**Rate**	**Rate Unit**	**342 DAT**		
1	Roundup ProMax	1.3	QT/A	42 abcd[2]	18 defg	40 abcde
2	Roundup ProMax Sahara	1.3 10	QT/A LB/A	40 bcde	2 g	58 a
3	Roundup ProMax Hyvar	1.3 10	QT/A LB/A	43 abcd	5 fg	52 abc
4	Roundup ProMax Oust XP	1.3 3	QT/A OZ/A	17 def	37 bcdef	47 abcd
5	Roundup ProMax Perspective Esplanade	1.3 9 3.5	QT/A OZ/A FL OZ/A	18 def	52 bc	30 abcde
6	Roundup ProMax Perspective Proclipse	1.3 9 2.3	QT/A OZ/A LB/A	30 cdef	30 bcdefg	40 abcde
7	Roundup ProMax Viewpoint Esplanade	1.3 18 3.5	QT/A OZ/A FL OZ/A	73 a	7 efg	20 cde
8	Roundup ProMax Polaris AC Complete	1.3 2	QT/A PT/A	42 abcd	2 g	58 ab
9	Roundup ProMax Esplanade Oust XP	1.3 3.5 3	QT/A FL OZ/A OZ/A	67 ab	2 g	32 abcde
10	Roundup ProMax Streamline Esplanade Plateau	1.3 8 5 5	QT/A OZ/A FL OZ/A FL OZ/A	43 abcd	38 bcde	18 de
11	Rodeo Cleantraxx Milestone VM	1.5 3 7	QT/A PT/A FL OZ/A	63 ab	12 efg	25 bcde
12	Rodeo Cleantraxx	1.5 4.5	QT/A PT/A	63 ab	8 efg	28 abcde

*All herbicide treatments (except trt. #1) contained the adjuvant, Activator 90 at 0.25% v/v.

[1] *DAT = Days after treatment*

[2] *Means within a column followed by the same letter are not different according to Fisher's LSD at P < 0.05.*

Table 6b. Results for Cable Barrier Trial 342 DAT[1] (April 30, 2019) (Part 2 of 2)

				% Bareground	% Grass	% Broadleaves
Trt. No.	**Product Name***	**Rate**	**Rate Unit**	**342 DAT**		
13	Rodeo Method Esplanade	1.5 12 5	QT/A FL OZ/A FL OZ/A	55 abc[2]	28 bcdefg	17 de
14	Rodeo Esplanade Milestone VM	1.5 6 7	QT/A FL OZ/A FL OZ/A	63 ab	23 cdefg	14 e
15	Rodeo Esplanade Oust Extra	1.5 3.5 1.5	QT/A FL OZ/A OZ/A	27 cdef	45 bcd	28 abcde
16	Rodeo Detail	1.5 2	QT/A FL OZ/A	8 ef	32 bcdefg	60 a
17	Method Plateau	12 3	FL OZ/A FL OZ/A	2 f	88 a	10 e
18	Nontreated Check			0 f	60 ab	40 abcde

*All herbicide treatments (except trt. #1) contained the adjuvant, Activator 90 at 0.25% v/v.

[1] *DAT = Days after treatment*

[2] *Means within a column followed by the same letter are not different according to Fisher's LSD at P < 0.05.*

Figure 1: View of Plots in the Cable Barrier Trial on July 3, 2018 (41 Days After Treatment)

Note evidence of herbicide movement from where they were applied with damage to adjacent turf. The white line indicates the initial spray pattern. Treatment 1 (only Roundup ProMax) is the treatment at the bottom of the photo.

Figure 2: View of Treatment 1 plot in the Cable Barrier Trial on July 3, 2018 (41 Days After Treatment)
Only Roundup ProMax was sprayed for this treatment and one can see the extent of the spray pattern.

Figure 3: View of Treatment 2 and 1 plots the Cable Barrier Trial on July 3, 2018 (41 Days After Treatment)

Treatment 2 (Roundup ProMax + Sahara) was sprayed on the plot in the foreground. Note the turf damage beyond the initial spray pattern as seen on the plot closer to the truck which only had Roundup ProMax applied.

Figure 4: View of Treatment 3, 2, and 1 Plots in the Cable Barrier Trial on July 3, 2018 (41 Days After Treatment)

Treatment 3 (Roundup ProMax + Hyvar) was sprayed on the plot in the foreground. The extent of the damage appears to be greater than the Treatment 2 plot. Note the turf damage beyond the initial spray pattern as seen on the plot closest to the truck, which only had Roundup ProMax applied.

Figure 5: View of Treatment 4, 3, 2, and 1 Plots in the Cable Barrier Trial on July 3, 2018 (41 Days After Treatment)

Treatment 4 (Roundup ProMax + Oust) was sprayed on the plot in the foreground. Note the turf damage beyond the initial spray pattern as seen on the plot closest to the truck, which only had Roundup ProMax applied.

Figure 6: View of Plots in the Cable Barrier Trial on April 30, 2019 (342 Days After Treatment)
One can still see the sprayed plots with less vegetation than outside the plot area.

Figure 7: View of one of the "Best" Plots in the Cable Barrier Trial on April 30, 2019 (342 Days After Treatment)
Treatment 9 (Roundup ProMax + Oust + Esplanade) was sprayed on the plot in the foreground 342 days before photo was taken.