2019 Cable Barrier Bareground Trial in Louisville

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 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 20 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 21, 2019. All treatments, except Roundup ProMax alone (Treatment 1) and Rodeo + Detail + MSO (Treatment 18) 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. This year’s treatment list had a few changes from last year. One of our best performing treatments in 2018 was the combination of Viewpoint plus Esplanade but since it is more expensive this year Viewpoint alone was applied (Treatment 7). In 2018 one of the combinations recommended by industry reps was the combination of Method @ 12 fl oz plus Esplanade (Treatment 13) while in 2019 the recommendation was reduced to Method @ 6 fl oz to reduce the risk of damage from movement after application to sensitive crops, like tobacco (Treatments 14 & 15). The current recommendation also includes the addition of NuFilm IR to reduce the risk of movement from where the herbicide was applied (Treatment 15). New treatments this year also included Detail (saflufenacil) @ 6 fl oz (Treatment 18) and one without glyphosate designed to control broadleaf weeds and suppressing grass growth behind guardrails (Treatment 19). Detail may be useful in areas with sensitive crops nearby as it is less persistent than other herbicides.

The Louisville weather station reported 0.41 inches of rain May 26 which should have activated the soil residual herbicide treatments. Additional rainfall was recorded from May 29 to 30 (1.31 inches). Species present at application included flowering Buckhorn plantain (12 inches to

seedhead), flowering tall fescue (24 inches to seedhead), flowering Kentucky bluegrass (12 inches to seedhead) and flowering black medic (5 inches to seedhead).

Visual assessments of the proportion (%) of bare ground, grasses, and broadleaf weeds were taken 64 days after treatment (DAT) (7/24/2019). The trial area had recently been mowed and string trimmed by mistake. Assessments for (%) bareground, annual grasses, crabgrass, perennial grasses, broadleaf weeds, and prostrate spurge were done 114 DAT (9/12/2019) and 157 DAT (10/25/2019). 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 the treatments with glyphosate (Treatments 1 to 18) had more bareground (27 to 96%) than those that did not (Treatments 19 and 20) (8%) 64 DAT (Tables 2a and 2b). The treatments with soil active herbicides that included Esplanade were in the top grouping with 89 to 96% bareground. These were Perspective + Esplanade (Treatment 5), Esplanade + Oust (Treatment 9), Streamline + Esplanade + Plateau (Treatment 10), Method + Esplanade (Treatments 13 – 15), Esplanade + Milestone (Treatment 16), and Esplanade + Oust Extra (Treatment 17). Turf damage beyond the spray pattern due to herbicide movement after application was not observed to the same extent as in 2018. Treatments without glyphosate (Treatments 19 and 20) had 82-83% grass cover.

By 114 DAT some treatments had less bareground as annual grasses (mostly yellow foxtail and crabgrass) and broadleaves (mostly prostrate spurge) colonized the space (Figure 1) (Tables 3a and 3b). Treatments in the top group for bareground (75 to 89%) were the same ones that included Esplanade listed above at 64 DAT. A number of treatments had the same percent bareground (10-23%) as the nontreated check. These included Roundup ProMax (Treatment 1), Perspective + Proclipse (Treatment 6), Viewpoint (Treatment 7), Polaris AC Complete (Treatment 8), Cleantraxx + Milestone (Treatment 11), Cleantraxx (Treatment 12), Detail (Treatment 18), and Method + Escort + Plateau (Treatment 19). The treatments with most annual grass cover (48-60%) included Roundup ProMax (Treatment 1), Polaris AC Complete (Treatment 8), and Detail (Treatment 18). Some treatments had higher levels of crabgrass cover (17-35%). These included Roundup ProMax (Treatment 1), Rodeo + Detail (Treatment 18), and two treatments containing imazapyr, Viewpoint (Treatment 7) and Polaris AC Complete (Treatment 8). A similar pattern was observed in a 2016 guardrail trial near Louisa with imazapyr herbicides and crabgrass. The treatments with the most broadleaf cover (42-70%) (mostly spurge) included Hyvar (treatment 3), Oust (Treatment 4), Perspective + Proclipse (Treatment 6), Cleantraxx + Milestone (Treatment 11) and Cleantraxx (Treatment 12). The two treatments without glyphosate (Treatments 19 and 20) had 52-62% perennial grass cover.

By the end of the season (157 DAT) the top treatments were still the same as at 64 DAT but had more vegetative cover but still had 70-83% bareground (Tables 4a and 4b). The study location (Bluegrass Region CD2) had a very dry September with 0.19" which is 3.40" less than the long term average. This may have reduced the growth of emerged vegetation and germination/emergence of new vegetation. Plots with the greatest annual grass (47-58%), particularly crabgrass cover (18-33%), stood out. These included Roundup ProMax (Treatment

1), Viewpoint (Treatment 7), Polaris AC Complete (Treatment 8), and Detail (Treatment 18). Plots with the most broadleaf cover (48-68%) (mostly prostrate spurge) were the same treatments as observed at 114 DAT. Treatments without glyphosate (Treatments 19 and 20) had 42-55% perennial grass cover.

The vegetation under the cable barrier at this location provided a good trial on the performance of bare ground herbicides over a season and into the next year. These plots will be reassessed in spring 2020, which 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
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 & #18) contained the adjuvant, Activator 90 at 0.25% v/v.
Treatment 18 included MSO @ 1%

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
	Method	6	FL OZ/A	aminocyclopyrachlor	1.5 OZ AE	4
	Esplanade	6	FL OZ/A	indaziflam	1.2 OZ	29
15	Rodeo	1.5	QT/A	glyphosate	1.5 LB AE	9
	Method	6	FL OZ/A	aminocyclopyrachlor	1.5 OZ AE	4
	Esplanade	6	FL OZ/A	indaziflam	1.2 OZ	29
	NuFilm IR	24	FL OZ/A	Pinolene		
16	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
17	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
18	Rodeo	1.5	QT/A	glyphosate	1.5 LB AE	9
	Detail	6	FL OZ/A	saflufenacil	2.1 OZ	14
19	Method	4	FL OZ/A	aminocyclopyrachlor	1 OZ AE	4
	Escort	0.33	OZ/A	metsulfuron	0.2 OZ	2
	Plateau	3	FL OZ/A	imazapic	0.75 OZ AE	2
20	Nontreated Check					

*All herbicide treatments (except trt. #1 & #18) contained the adjuvant, Activator 90 at 0.25% v/v.
Treatment 18 included MSO @ 1%

Table 2a. Results for Cable Barrier Trial 64 DAT[1] (July 24, 2019) (Part 1 of 2)

				% Bareground	% Grass	% Broadleaves
Trt. No.	**Product Name***	**Rate**	**Rate Unit**	**64 DAT**		
1	Roundup ProMax	1.3	QT/A	27 f	43 c	30 bc
2	Roundup ProMax Sahara	1.3 10	QT/A LB/A	73 bc	5 f	22 bcde
3	Roundup ProMax Hyvar	1.3 10	QT/A LB/A	50 de	13 def	37 ab
4	Roundup ProMax Oust XP	1.3 3	QT/A OZ/A	70 c	9 ef	21 bcdef
5	Roundup ProMax Perspective Esplanade	1.3 9 3.5	QT/A OZ/A FL OZ/A	89 ab	8 ef	2 g
6	Roundup ProMax Perspective Proclipse	1.3 9 2.3	QT/A OZ/A LB/A	65 cd	9 ef	26 bcde
7	Roundup ProMax Viewpoint	1.3 18	QT/A OZ/A	40 ef	23 de	37 ab
8	Roundup ProMax Polaris AC Complete	1.3 2	QT/A PT/A	40 ef	27 d	27 bcd
9	Roundup ProMax Esplanade Oust XP	1.3 3.5 3	QT/A FL OZ/A OZ/A	93 a	4 f	3 fg
10	Roundup ProMax Streamline Esplanade Plateau	1.3 8 5 5	QT/A OZ/A FL OZ/A FL OZ/A	96 a	2 f	1 g
11	Rodeo Cleantraxx Milestone VM	1.5 3 7	QT/A PT/A FL OZ/A	40 ef	10 ef	53 a
12	Rodeo Cleantraxx	1.5 4.5	QT/A PT/A	52 de	15 def	37 ab

*All herbicide treatments (except trt. #1 & #18) contained the adjuvant, Activator 90 at 0.25% v/v.
Treatment 18 included MSO @ 1%

Table 2b. Results for Cable Barrier Trial 64 DAT[1] (July 24, 2019) (Part 2 of 2)

				% Bareground	% Grass	% Broadleaves
Trt. No.	**Product Name***	**Rate**	**Rate Unit**	**64 DAT**		
13	Rodeo	1.5	QT/A	92 a	8 ef	0 g
	Method	12	FL OZ/A			
	Esplanade	5	FL OZ/A			
14	Rodeo	1.5	QT/A	89 ab	10 ef	0 g
	Method	6	FL OZ/A			
	Esplanade	6	FL OZ/A			
15	Rodeo	1.5	QT/A	90 ab	10 ef	0 g
	Method	6	FL OZ/A			
	Esplanade	6	FL OZ/A			
	NuFilm IR	24	FL OZ/A			
16	Rodeo	1.5	QT/A	93 a	7 f	0 g
	Esplanade	6	FL OZ/A			
	Milestone VM	7	FL OZ/A			
17	Rodeo	1.5	QT/A	96 a	1 f	3 fg
	Esplanade	3.5	FL OZ/A			
	Oust Extra	1.5	OZ/A			
18	Rodeo	1.5	QT/A	28 f	65 b	13 cdefg
	Detail	6	FL OZ/A			
19	Method	4	FL OZ/A	8 g	83 a	8 efg
	Escort	0.33	OZ/A			
	Plateau	3	FL OZ/A			
20	Nontreated Check			8 g	82 a	10 defg

*All herbicide treatments (except trt. #1 & #18) contained the adjuvant, Activator 90 at 0.25% v/v.
Treatment 18 included MSO @ 1%

Table 3a. Results for Cable Barrier Trial 114 DAT[1] (September 12, 2019) (Part 1 of 2)

				% Bareground	% Annual Grass	% Crabgrass	% Perennial Grass	% Broadleaves	% Spurge
Trt. No.	**Product Name***	**Rate**	**Rate Unit**	**114 DAT**					
1	Roundup ProMax	1.3	QT/A	22 cd	48 ab	17 abcd	0 c	27 cde	23 ef
2	Roundup ProMax Sahara	1.3 10	QT/A LB/A	40 b	10 cd	3 d	7 c	43 bc	42 cde
3	Roundup ProMax Hyvar	1.3 10	QT/A LB/A	27 bc	15 cd	2 d	0 c	58 ab	57 abc
4	Roundup ProMax Oust XP	1.3 3	QT/A OZ/A	27 bc	21 cd	2 d	0 c	53 ab	45 bcd
5	Roundup ProMax Perspective Esplanade	1.3 9 3.5	QT/A OZ/A FL OZ/A	81 a	4 d	0 d	3 c	13 de	8 f
6	Roundup ProMax Perspective Proclipse	1.3 9 2.3	QT/A OZ/A LB/A	23 cd	6 d	0 d	2 c	69 a	65 ab
7	Roundup ProMax Viewpoint	1.3 18	QT/A OZ/A	15 cd	42 b	25 abc	0 c	43 bc	43 cde
8	Roundup ProMax Polaris AC Complete	1.3 2	QT/A PT/A	20 cd	50 ab	30 ab	0 c	30 cd	23 ef
9	Roundup ProMax Esplanade Oust XP	1.3 3.5 3	QT/A FL OZ/A OZ/A	75 a	9 cd	5 cd	0 c	16 de	13 f
10	Roundup ProMax Streamline Esplanade Plateau	1.3 8 5 5	QT/A OZ/A FL OZ/A FL OZ/A	80 a	4 d	0 d	1 c	14 de	14 f
11	Rodeo Cleantraxx Milestone VM	1.5 3 7	QT/A PT/A FL OZ/A	12 cd	18 cd	5 cd	0 c	70 a	70 a
12	Rodeo Cleantraxx	1.5 4.5	QT/A PT/A	17 cd	23 c	10 bcd	0 c	61 ab	58 abc

*All herbicide treatments (except trt. #1 & #18) contained the adjuvant, Activator 90 at 0.25% v/v.
Treatment 18 included MSO @ 1%

Table 3b. Results for Cable Barrier Trial 114 DAT[1] (September 12, 2019) (Part 2 of 2)

				% Bareground	% Annual Grass	% Crabgrass	% Perennial Grass	% Broadleaves	% Spurge
Trt. No.	**Product Name***	**Rate**	**Rate Unit**	**114 DAT**					
13	Rodeo	1.5	QT/A	80 a	6 cd	0 d	5 c	9 de	9 f
	Method	12	FL OZ/A						
	Esplanade	5	FL OZ/A						
14	Rodeo	1.5	QT/A	84 a	3 d	0 d	6 c	7 e	6 f
	Method	6	FL OZ/A						
	Esplanade	6	FL OZ/A						
15	Rodeo	1.5	QT/A	82 a	4 d	0 d	7 c	7 e	7 f
	Method	6	FL OZ/A						
	Esplanade	6	FL OZ/A						
	NuFilm IR	24	FL OZ/A						
16	Rodeo	1.5	QT/A	89 a	4 d	0 d	1 c	6 e	6 f
	Esplanade	6	FL OZ/A						
	Milestone VM	7	FL OZ/A						
17	Rodeo	1.5	QT/A	87 a	3 d	1 d	0 c	10 de	9 f
	Esplanade	3.5	FL OZ/A						
	Oust Extra	1.5	OZ/A						
18	Rodeo	1.5	QT/A	15 cd	60 a	35 a	0 c	25 cde	25 def
	Detail	6	FL OZ/A						
19	Method	4	FL OZ/A	12 cd	23 c	3 d	52 b	13 de	13 f
	Escort	0.33	OZ/A						
	Plateau	3	FL OZ/A						
20	Nontreated Check			10 d	14 cd	5 cd	62 a	14 de	10 f

*All herbicide treatments (except trt. #1 & #18) contained the adjuvant, Activator 90 at 0.25% v/v.
Treatment 18 included MSO @ 1%

Table 4a. Results for Cable Barrier Trial 157 DAT[1] (October 25, 2019) (Part 1 of 2)

				% Bareground	% Annual Grass	% Crabgrass	% Perennial Grass	% Broadleaves	% Spurge
Trt. No.	**Product Name***	**Rate**	**Rate Unit**	**157 DAT**					
1	Roundup ProMax	1.3	QT/A	25 bcd	58 a	18 abc	1 b	16 fg	13 ef
2	Roundup ProMax Sahara	1.3 10	QT/A LB/A	35 b	11 de	2 c	12 b	42 bcde	40 bcd
3	Roundup ProMax Hyvar	1.3 10	QT/A LB/A	30 bc	20 cde	0 c	2 b	48 abcd	46 abc
4	Roundup ProMax Oust XP	1.3 3	QT/A OZ/A	28 bcd	19 cde	0 c	0 b	52 abc	41 bcd
5	Roundup ProMax Perspective Esplanade	1.3 9 3.5	QT/A OZ/A FL OZ/A	77 a	5 de	0 c	6 b	12 fg	6 f
6	Roundup ProMax Perspective Proclipse	1.3 9 2.3	QT/A OZ/A LB/A	23 bcd	7 de	0 c	3 b	67 ab	63 ab
7	Roundup ProMax Viewpoint	1.3 18	QT/A OZ/A	18 cde	47 ab	33 a	0 b	35 cdef	33 cde
8	Roundup ProMax Polaris AC Complete	1.3 2	QT/A PT/A	23 bcd	50 ab	30 a	0 b	27 defg	21 def
9	Roundup ProMax Esplanade Oust XP	1.3 3.5 3	QT/A FL OZ/A OZ/A	70 a	6 de	3 c	0 b	24 defg	14 ef
10	Roundup ProMax Streamline Esplanade Plateau	1.3 8 5 5	QT/A OZ/A FL OZ/A FL OZ/A	80 a	4 e	0 c	1 b	15 fg	15 ef
11	Rodeo Cleantraxx Milestone VM	1.5 3 7	QT/A PT/A FL OZ/A	17 cde	21 cde	3 c	1 b	61 ab	60 ab
12	Rodeo Cleantraxx	1.5 4.5	QT/A PT/A	13 de	18 cde	7 bc	0 b	68 a	66 a

*All herbicide treatments (except trt. #1 & #18) contained the adjuvant, Activator 90 at 0.25% v/v.
Treatment 18 included MSO @ 1%

Table 4b. Results for Cable Barrier Trial 157 DAT[1] (October 25, 2019 (Part 2 of 2)

				% Bareground	% Annual Grass	% Crabgrass	% Perennial Grass	% Broadleaves	% Spurge
Trt. No.	**Product Name***	**Rate**	**Rate Unit**	**157 DAT**					
13	Rodeo	1.5	QT/A	80 a	4 e	0 c	8 b	7 g	6 f
	Method	12	FL OZ/A						
	Esplanade	5	FL OZ/A						
14	Rodeo	1.5	QT/A	79 a	4 e	0 c	9 b	8 g	3 f
	Method	6	FL OZ/A						
	Esplanade	6	FL OZ/A						
15	Rodeo	1.5	QT/A	78 a	4 e	0 c	12 b	6 g	5 f
	Method	6	FL OZ/A						
	Esplanade	6	FL OZ/A						
	NuFilm IR	24	FL OZ/A						
16	Rodeo	1.5	QT/A	83 a	4 de	0 c	5 b	7 g	7 f
	Esplanade	6	FL OZ/A						
	Milestone VM	7	FL OZ/A						
17	Rodeo	1.5	QT/A	82 a	4 e	0 c	0 b	14 fg	12 ef
	Esplanade	3.5	FL OZ/A						
	Oust Extra	1.5	OZ/A						
18	Rodeo	1.5	QT/A	18 cde	52 ab	25 ab	3 b	27 defg	20 def
	Detail	6	FL OZ/A						
19	Method	4	FL OZ/A	7 e	32 bc	0 c	42 a	20 efg	13 ef
	Escort	0.33	OZ/A						
	Plateau	3	FL OZ/A						
20	Nontreated Check			5 e	25 cd	5 bc	55 a	15 fg	8 f

*All herbicide treatments (except trt. #1 & #18) contained the adjuvant, Activator 90 at 0.25% v/v.
Treatment 18 included MSO @ 1%

Figure 1: View of Plots in the Cable Barrier Trial on September 12, 2019 (114 Days After Treatment)

One can see plots covered with annual grasses in the foreground along with a group of plots largely bareground closer to the truck..