

## 2016 Guardrail Trial near Louisa

### *Introduction*

For highway safety, guardrails need to be kept clear of visual obstructions. Usually that means maintaining a vegetation free zone underneath them. Applications of broad-spectrum pre-emergent residual herbicides, in combination with a broad spectrum post-emergent herbicide like glyphosate, are the mainstay for bare ground maintenance operations. Ideally, the pre-emergent herbicides will last all season long and not move off-site by leaching or erosion (movement of soil particles with adsorbed herbicide). Evaluating the efficacy of these products and product combinations in comparison with older products is an ongoing effort.

### *Materials and Methods*

The trial was established under and beside guardrail along KY 32 near Louisa, KY with 13 treatments and 3 replications arranged in a randomized complete block design. On June 1, 2016, treatments were applied at 25 gallons/acre with a spray swath on either side of the guardrail for a plot width of 6.5 ft and length of 12 ft (two areas between guardrail posts per plot). All herbicide treatments, except Roundup ProMax alone (Treatment 1), included Activator 90 at 0.25% v/v (Table 1).

Roundup ProMax (glyphosate) has no residual activity so other herbicides were included in combinations with it to provide residual and pre-emergent control. The Jackson weather station reported 0.19 and 1.22 inches of rain on June 3 and 5, respectively, which would have activated the pre-emerge herbicide treatments. A new product to the IVM market, Cleantraxx from Dow AgroSciences, was included in this year's trials. Cleantraxx is a product with two herbicide mechanisms of action (Groups 2 and 14) which will help with resistance management, as it is the only Group 14 (PPO inhibitor) product in the trial.

The weeds present at application included perennial grasses (flowering tall fescue), flowering fleabane, flowering buckhorn plantain, hemp dogbane and bush honeysuckle. This section of guardrail had not been sprayed for several seasons. Visual % bare ground and percent cover of perennial grasses, annual grasses, and broadleaf species were assessed 65 (8/5/2016), 107 (9/16/2016), and 148 (10/27/2016) days after treatment (DAT). Weeds present in many of the plots 148 DAT included tall fescue, broomsedge, large crabgrass, foxtails, fall panicum, buckhorn plantain, black medic, and spurge. Data were analyzed using ARM software and treatment means were compared using Fisher's Protected LSD at  $p = 0.05$ .

### *Results and Discussion*

All herbicide treatments had more bareground (97-99%) than the control (12%) 65 DAT with the Roundup ProMax alone (Treatment 1) having less than the other herbicide treatments (Table 2). The Roundup ProMax alone treatment had broadleaf % cover similar to the control (32-42%).

Herbicide treatments with soil residual activity (Treatments 2-12) had more bare ground than the control or Roundup ProMax alone 107 DAT (Table 3). Some older products had less bareground than the best performers. These included Sahara (Treatment 2), Oust (Treatment 4), and Polaris

(Treatment 8). The Roundup ProMax alone (Treatment 1) had the most annual grass cover (23%) while the Oust XP treatment (Treatment 4) had the second most (16%). Once again, the Roundup ProMax alone treatment had broadleaf % cover similar to the control (30-45%).

At the end of the season, 148 DAT, herbicide treatments with soil residual activity (Treatments 2-12) had more bare ground than the control or Roundup ProMax alone (Table 4). Some older products had less bare ground than the best performers. These included Sahara (Treatment 2), Oust (Treatment 4), and Polaris (Treatment 8) as well as the new product Cleantraxx by itself (Treatment 12). At this assessment, there was considerable amounts of crabgrass in some plots. Interestingly, the control plots that had perennial grass cover did not have crabgrass. The plots with significant crabgrass (12-21%) included Roundup ProMax alone (Treatment 1), Oust XP alone (Treatment 4), Polaris AC Complete (Treatment 8), and Oust + Esplanade (Treatment 9). Treatments with the same amount of broadleaf cover as control were Roundup ProMax alone (Treatment 1), Sahara (Treatment 2), and the treatments with Cleantraxx (Treatments 11 and 12).

Most of the herbicide treatments with residual soil activity performed well over the course of the season. Time of application was a bit late for optimal pre-emerge crabgrass control but some treatments performed better than others.

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**Table 1. Herbicide treatments, active ingredients and application rates for Guardrail trial near Louisa.**

Treatment	Product Name	Rate <sup>1</sup>	Rate Unit	Active Ingredient(s)	ai Rate (per acre)
1	Roundup ProMax	1.3	QT/A	glyphosate	1.5 lb ae
2	Roundup ProMax Sahara	1.3 10	QT/A LB/A	glyphosate diuron + imazapyr	1.5 lb ae 6.2 lb + 12.4 oz
3	Roundup ProMax Hyvar	1.3 10	QT/A LB/A	glyphosate bromacil	1.5 lb ae 8 lb
4	Roundup ProMax Oust XP	1.3 3	QT/A OZ/A	glyphosate sulfometuron	1.5 lb ae 2.3 oz
5	Roundup ProMax Perspective Esplanade	1.3 9 3.5	QT/A OZ/A FL OZ/A	glyphosate aminocyclopyrachlor + chlorsulfuron indaziflam	1.5 lb ae 3.6 oz + 1.4 oz 0.7 oz
6	Roundup ProMax Perspective Endurance	1.3 9 2.3	QT/A OZ/A LB/A	glyphosate aminocyclopyrachlor + chlorsulfuron prodiamine	1.5 lb ae 3.6 oz + 1.4 oz 1.5 lb
7	Roundup ProMax Viewpoint  Esplanade	1.3 18 3.5	QT/A OZ/A FL OZ/A	glyphosate aminocyclopyrachlor + imazapyr + metsulfuron indaziflam	1.5 lb ae 4.1 oz + 5.7 oz + 1.3 oz 0.7 oz
8	Roundup ProMax Polaris AC Complete	1.3 2	QT/A PT/A	glyphosate imazapyr	1.5 lb ae 16 oz ae
9	Roundup ProMax Esplanade Oust XP	1.3 3.5 3	QT/A FL OZ/A OZ/A	glyphosate indaziflam sulfometuron	1.5 lb ae 0.7 oz 2.3 oz
10	Roundup ProMax Streamline Esplanade Plateau	1.3 8 5 5	QT/A OZ/A FL OZ/A FL OZ/A	glyphosate aminocyclopyrachlor + metsulfuron indaziflam imazapic	1.5 lb ae 3.2 oz + 1 oz 1.0 oz 1.3 oz ae
11	Rodeo Cleantraxx Milestone VM	1.5 3 7	QT/A PT/A FL OZ/A	glyphosate penoxsulam + oxyfluorfen aminopyralid	1.5 lb ae 0.5 oz + 23.6 oz 1.8 oz ae
12	Rodeo Cleantraxx	1.5 4.5	QT/A PT/A	glyphosate penoxsulam + oxyfluorfen	1.5 lb ae 0.75 oz + 35.4 oz
13	Untreated Check				

<sup>1</sup>All herbicide treatments (except Roundup ProMax alone, Treatment 1) contained the adjuvant, Activator 90 at 0.25% v/v.

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**Table 2: Results for Guardrail Trial near Louisa 65 DAT<sup>d</sup> (August 5, 2016)**

Trt. No.	Product Name	Rate	Rate Unit	% Bare Ground	% Perennial Grass	% Annual Grass	% Broadleaves
				65 DAT			
1	Roundup ProMax	1.3	QT/A	63 b <sup>2</sup>	0 b	5 a	32 a
2	Roundup ProMax Sahara	1.3 10	QT/A LB/A	98 a	0 b	1 cd	1 b
3	Roundup ProMax Hyvar	1.3 10	QT/A LB/A	98 a	0 b	0 d	1 b
4	Roundup ProMax Oust XP	1.3 3	QT/A OZ/A	96 a	0 b	4 ab	0 b
5	Roundup ProMax Perspective Esplanade	1.3 9 3.5	QT/A OZ/A FL OZ/A	98 a	0 b	1 bcd	0 b
6	Roundup ProMax Perspective Endurance	1.3 9 2.3	QT/A OZ/A LB/A	97 a	0 b	3 abcd	0 b
7	Roundup ProMax Viewpoint Esplanade	1.3 18 3.5	QT/A OZ/A FL OZ/A	99 a	0 b	1 cd	0 b
8	Roundup ProMax Polaris AC Complete	1.3 2	QT/A PT/A	97 a	0 b	2 bcd	1 b
9	Roundup ProMax Esplanade Oust XP	1.3 3.5 3	QT/A FL OZ/A OZ/A	97 a	0 b	0 d	2 b
10	Roundup ProMax Streamline Esplanade Plateau	1.3 8 5 5	QT/A OZ/A FL OZ/A FL OZ/A	99 a	0 b	1 cd	0 b
11	Rodeo Cleantraxx Milestone VM	1.5 3 7	QT/A PT/A FL OZ/A	98 a	0 b	1 cd	1 b
12	Rodeo Cleantraxx	1.5 4.5	QT/A PT/A	97 a	0 b	1 cd	2 b
13	Nontreated Check			12 c	43 a	3 abc	42 a

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

<sup>1</sup> DAT = Days after treatment

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

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**Table 3: Results for Guardrail Trial near Louisa 107 DAT<sup>1</sup> (September 16, 2016)**

Trt. No.	Product Name	Rate	Rate Unit	% Bare Ground	% Perennial Grass	% Annual Grass	% Broadleaves
				107 DAT			
1	Roundup ProMax	1.3	QT/A	32 e <sup>2</sup>	0 b	23 a	45 a
2	Roundup ProMax Sahara	1.3 10	QT/A LB/A	87 bcd	1 b	3 cd	9 c
3	Roundup ProMax Hyvar	1.3 10	QT/A LB/A	96 ab	0 b	0 d	3 c
4	Roundup ProMax Oust XP	1.3 3	QT/A OZ/A	83 d	0 b	16 b	0 c
5	Roundup ProMax Perspective Esplanade	1.3 9 3.5	QT/A OZ/A FL OZ/A	93 abcd	0 b	4 cd	3 c
6	Roundup ProMax Perspective Endurance	1.3 9 2.3	QT/A OZ/A LB/A	94 abcd	0 b	3 cd	3 c
7	Roundup ProMax Viewpoint Esplanade	1.3 18 3.5	QT/A OZ/A FL OZ/A	96 abc	0 b	4 cd	1 c
8	Roundup ProMax Polaris AC Complete	1.3 2	QT/A PT/A	85 cd	0 b	9 c	6 c
9	Roundup ProMax Esplanade Oust XP	1.3 3.5 3	QT/A FL OZ/A OZ/A	90 abcd	0 b	6 cd	4 c
10	Roundup ProMax Streamline Esplanade Plateau	1.3 8 5 5	QT/A OZ/A FL OZ/A FL OZ/A	99 a	0 b	1 d	0 c
11	Rodeo Cleantraxx Milestone VM	1.5 3 7	QT/A PT/A FL OZ/A	88 abcd	2 b	1 d	9 c
12	Rodeo Cleantraxx	1.5 4.5	QT/A PT/A	88 abcd	0 b	3 cd	9 c
13	Nontreated Check			13 f	43 a	3 cd	30 b

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

<sup>1</sup> DAT = Days after treatment

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

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**Table 4: Results for Guardrail Trial near Louisa 148 DAT<sup>1</sup> (October 27, 2016)**

Trt. No.	Product Name	Rate	Rate Unit	% Bare Ground	% Perennial Grass	% Crabgrass	% Annual Grass	% Broadleaves
				148 DAT				
1	Roundup ProMax	1.3	QT/A	48 c <sup>2</sup>	0 b	17 a	18 a	33 a
2	Roundup ProMax Sahara	1.3 10	QT/A LB/A	75 b	0 b	4 bcd	6 bcd	19 ab
3	Roundup ProMax Hyvar	1.3 10	QT/A LB/A	88 ab	0 b	1 cd	1 d	11 b
4	Roundup ProMax Oust XP	1.3 3	QT/A OZ/A	73 b	0 b	21 a	21 a	6 b
5	Roundup ProMax Perspective Esplanade	1.3 9 3.5	QT/A OZ/A FL OZ/A	85 ab	1 b	3 cd	4 bcd	12 b
6	Roundup ProMax Perspective Endurance	1.3 9 2.3	QT/A OZ/A LB/A	88 ab	0 b	0 d	2 cd	10 b
7	Roundup ProMax Viewpoint Esplanade	1.3 18 3.5	QT/A OZ/A FL OZ/A	90 ab	0 b	3 cd	6 bcd	3 b
8	Roundup ProMax Polaris AC Complete	1.3 2	QT/A PT/A	75 b	0 b	15 ab	15 ab	10 b
9	Roundup ProMax Esplanade Oust XP	1.3 3.5 3	QT/A FL OZ/A OZ/A	82 ab	0 b	12 abc	13 abc	5 b
10	Roundup ProMax Streamline Esplanade Plateau	1.3 8 5 5	QT/A OZ/A FL OZ/A FL OZ/A	96 a	0 b	1 cd	2 cd	2 b
11	Rodeo Cleantraxx Milestone VM	1.5 3 7	QT/A PT/A FL OZ/A	78 ab	0 b	1 cd	3 cd	19 ab
12	Rodeo Cleantraxx	1.5 4.5	QT/A PT/A	77 b	0 b	1 cd	4 bcd	19 ab
13	Nontreated Check			13 d	47 a	0 d	2 d	38 a

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

<sup>1</sup> DAT = Days after treatment

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