

Noncrop and Invasive Vegetation Management Weed Science

2013 Annual Research Report



**UNIVERSITY
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2013 Guardrail Trial in Elizabethtown

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 bareground maintenance operations. Ideally, the pre-emergent herbicides will last season long and not move off-site, by leaching or erosion (movement of soil particles with adsorbed herbicide). A number of new products (Perspective, Viewpoint, Esplanade) have recently been introduced to this market. Perspective is a combination of aminocyclopyrachlor and chlorsulfuron. Viewpoint is a combination of aminocyclopyrachlor and imazapyr plus metsulfuron. Esplanade is indaziflam. 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 near and along KY 1136 near Elizabethtown, KY with 13 treatments and 3 replications arranged in a randomized complete block design. On May 23, 2013, 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 (Trt. 1), included Activator 90 at 0.25% v/v (Table 1). The treatments were the same as for the 2012 trial in Paintsville. Roundup ProMax (glyphosate) has no residual activity so other herbicides were included in the combinations with it to provide residual and pre-emergent control. The Louisville weather station reported 0.32 inches of rain on May 31, which would have activated the pre-emerge herbicide treatments. The weeds present at application included perennial grasses (flowering tall fescue), cheat grass, flowering musk thistle, flowering poison hemlock, spotted knapweed, yellow sweet clover, and vetch. Visual % bareground ratings were taken 56 (7/18/2013), 98 (8/29/2013), and 138 (10/8/2013) days after treatment (DAT). Weeds present in many of the plots 138 DAT included johnsongrass, tall fescue, large crabgrass, thistles, poison hemlock, spotted knapweed, morning glory, vetch, buckhorn plantain, 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 treatments had more bareground than the control at all assessments (Table 2). Roundup ProMax alone (Trt. 1) had less bareground than the top group of treatments at all assessments. At the 98 and 138 DAT assessments, the Pendulum AquaCap + Milestone VM combination treatment (Trt. 6) was not among the top group of treatments. By the 138 DAT assessment, the treatment with Payload as the residual herbicide (Trt. 5) "dropped out" of the top group of treatments. Treatments with new lower use rate products (Perspective, Viewpoint, Esplanade) by themselves or in combination with other residual herbicides performed well.

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Table 1: Herbicide Treatments, Active Ingredients, and Application Rates for the 2013 Guardrail Trial.

Trt. No.	Product Name	Rate	Rate Unit	Active Ingredient(s)	ai Rate (per acre)
1	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE
2	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE
	Sahara	10	LB/A	diuron + imazapyr	6.2 LB + 12.4 OZ
3	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE
	Hyvar	10	LB/A	bromacil	8 LB
4	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE
	Oust XP	3	OZ/A	sulfometuron	2.3 OZ
5	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE
	Payload	12	OZ/A	flumioxazin	6.1 OZ
6	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE
	Pendulum AquaCap	4	QT/A	pendimethalin	3.8 LB
	Milestone VM	7	FL OZ/A	aminopyralid	1.8 OZ AE
7	Roundup ProMax	1	QT/A	glyphosate	1.1 LB AE
	Journey	1	QT/A	glyphosate + imazapic	0.4 LB AE + 3 OZ AE
	Milestone VM	7	FL OZ/A	aminopyralid	1.8 OZ AE
8	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE
	Perspective	9	OZ/A	aminocyclopyrachlor + chlorsulfuron	3.6 OZ + 1.4 OZ
	Esplanade	3.5	FL OZ/A	indaziflam	0.7 OZ
9	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE
	Perspective	9	OZ/A	aminocyclopyrachlor + chlorsulfuron	3.6 OZ + 1.4 OZ
	Endurance	2.3	LB/A	prodiamine	1.5 LB
10	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE
	Viewpoint	18	OZ/A	aminocyclopyrachlor + imazapyr + metsulfuron	4.1 OZ + 5.7 OZ + 1.3 OZ
11	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE
	Arsenal	4	PT/A	imazapyr	16 OZ AE
12	Roundup ProMax	1.3	QT/A	glyphosate	1.5 LB AE
	Esplanade	3.5	FL OZ/A	indaziflam	0.7 OZ
	Oust XP	3	OZ/A	sulfometuron	2.3 OZ
13	Nontreated Check				

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

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Table 2: Treatments and Results from 2013 Elizabethtown Guardrail Trial

Trt. No.	Product Name	Rate	Rate Unit	% Bareground		
				56 DAT	98 DAT	138 DAT
1	Roundup ProMax	1.3	QT/A	78 <i>b</i>	67 <i>b</i>	70 <i>bcd</i>
2	Roundup ProMax Sahara	1.3 10	QT/A LB/A	100 <i>a</i>	97 <i>a</i>	83 <i>abc</i>
3	Roundup ProMax Hyvar	1.3 10	QT/A LB/A	91 <i>ab</i>	91 <i>a</i>	89 <i>abc</i>
4	Roundup ProMax Oust XP	1.3 3	QT/A OZ/A	100 <i>a</i>	99 <i>a</i>	92 <i>ab</i>
5	Roundup ProMax Payload	1.3 12	QT/A OZ/A	88 <i>ab</i>	76 <i>ab</i>	65 <i>bc</i>
6	Roundup ProMax Pendulum AquaCap Milestone VM	1.3 4 7	QT/A QT/A FL OZ/A	95 <i>ab</i>	67 <i>b</i>	56 <i>de</i>
7	Roundup ProMax Journey Milestone VM	1 1 7	QT/A QT/A FL OZ/A	98 <i>ab</i>	96 <i>a</i>	77 <i>abcd</i>
8	Roundup ProMax Perspective Esplanade	1.3 9 3.5	QT/A OZ/A FL OZ/A	100 <i>a</i>	98 <i>a</i>	95 <i>ab</i>
9	Roundup ProMax Perspective Endurance	1.3 9 2.3	QT/A OZ/A LB/A	100 <i>a</i>	89 <i>ab</i>	81 <i>abcd</i>
10	Roundup ProMax Viewpoint	1.3 18	QT/A OZ/A	100 <i>a</i>	91 <i>a</i>	86 <i>abc</i>
11	Roundup ProMax Arsenal	1.3 4	QT/A PT/A	100 <i>a</i>	95 <i>a</i>	80 <i>abcd</i>
12	Roundup ProMax Esplanade Oust XP	1.3 3.5 3	QT/A FL OZ/A OZ/A	100 <i>a</i>	99 <i>a</i>	96 <i>a</i>
13	Nontreated Check			38 <i>c</i>	30 <i>c</i>	32 <i>e</i>

Means within a column followed by the same letter are not different according to Fisher's Protected LSD at $P < 0.05$.
All herbicide treatments (except Trt. #1) contained the adjuvant, Activator 90 at 0.25% v/v.

2013 Johnsongrass Control Trials

Introduction

Johnsongrass is a perennial warm season grass, listed as a noxious weed, and a common problem on right-of-way sites. There are a number of herbicides labeled and available to control johnsongrass but many can damage desirable cool season turf species, like tall fescue. One of the more selective herbicides for johnsongrass control is Fusion but a label change in 2012 made it unavailable for use on right-of-way sites. These trials are a continuation of the evaluation of the efficacy of a range of johnsongrass control/suppression options (alternatives to Fusion) including the tolerance of tall fescue to them.

Materials and Methods

Trials were established August 16, 2013 at Spindletop Research Farm and on August 20 near Camp Nelson along Hwy 27. The trials had 18 treatments with 3 replications arranged in a randomized complete block design with 5 ft by 30 ft plots. Application was at 30 gallons /acre. At Spindletop, the johnsongrass was 24 to 32 inches tall with an overall average canopy height of 30 inches and about 50% of plants had emerged seedheads. At the Camp Nelson site, the plants had been mowed earlier in the season. The plants were 20 to 30 inches tall with 5-6 leaves and none of them were flowering. These plots did not include tall fescue so a fescue damage trial was established Aug. 16, 2013 at Spindletop Research Farm. The plots were 5 ft x 20 ft with 5 ft unsprayed strips between each of the plots. The tall fescue canopy was at 10 inches. Johnsongrass control was assessed 14 (8/30/2013), 46 (10/1/2013), and 369 (8/20/2014) days after treatment (DAT) at Spindletop and 14 (9/3/2013), 42 (10/1/2013), and 303 (6/19/2014) DAT at the Camp Nelson site. Tall fescue damage (0 = dead to 9 = fully green; with unsprayed strips set at 8.0) was assessed 14 and 46 DAT. Grass stand density (0 – 9) was assessed 369 DAT. Data were analyzed using ARM software and treatment means were compared using Fisher's LSD at $p = 0.05$.

Table 1 lists the treatments, active ingredients and application rates. The 2011 Fusion label rates for selective control of johnsongrass were 7 to 9 fl oz per acre (Trts. 1 & 2). The labeled Fusilade II rates are repeated applications at 6 fl oz per acre to suppress johnsongrass in fine turf (Trt. 3). Trt. 4 is double this Fusilade II rate (12 fl oz/acre). The Acclaim Extra label lists 20 fl oz per acre to control seedling johnsongrass 12 – 24 inches tall (Trt. 5); 39 fl oz per acre to control rhizome johnsongrass 24 to 60 inches tall (Trt. 6); and a combination of Acclaim and Fusilade for improved turfgrass tolerance and to control rhizome johnsongrass 10 to 25 inches tall (Trt. 7). The Outrider label rates for selective johnsongrass control in tall fescue turf are 0.75 to 1 oz per acre (Trts. 8 & 9). Roundup (Trt. 13) and Journey (Trt. 16) are non-selective. Clearcast (Trt. 14) has an aquatic label and may be used close to waterways. The high rate of Plateau used in Trt. 15 will severely damage tall fescue. Pastora (Trt. 17) is only labeled for warm season pastures. MSMA can continue to be used and was included in these trials, but not in the 2012 trials. Trt. 10 is MSMA applied alone and Trt. 11 is MSMA applied in combination with Outrider at 0.75 oz per acre. Outrider is slow to show symptoms, so a combination of Outrider with Finale (Trt. 12) was included which would quickly injure johnsongrass.

Results and Discussion

At Spindletop, with many of the plants flowering at application, all the treatments controlled johnsongrass to some extent 46 and 369 DAT (Table 2). The slowest treatment to show symptoms was Pastora (Trt. 17). The most effective treatments 14 DAT were the MSMA treatments (Trts. 10 and 11), the Finale treatment (Trt. 12) and Roundup ProMax (Trt. 13), ranging from 83 to 88% control. At the 46 DAT assessment, these same treatments plus the high rate Acclaim Extra treatment (Trt. 6) were most effective, ranging from 78 to 98% johnsongrass control. The plots were not mowed before the final assessment in 2014 and early johnsongrass regrowth occurred under an established canopy. The most effective treatments 369 DAT were the Outrider treatments (Trts. 8 and 9), the MSMA treatments (Trts. 10 and 11), Roundup ProMax (Trt. 13), Plateau (Trt. 15), Journey (Trt. 16), and Pastora (Trt. 17), giving from 67 to 97% johnsongrass control.

At the Camp Nelson site, with younger non-flowering plants, all the treatments controlled johnsongrass to some extent 14, 42, and 303 DAT (Table 3). The most effective treatments 14 DAT were the ones with Fusion (Trts. 1 and 2), Fusilade II (Trts. 3 and 4), and Acclaim Extra (Trts. 5, 6, and 7) plus the Finale treatment (Trt. 12), providing from 65 to 75% control. The control plots had vigorous flowering plants 42 DAT and many of the plots already had regrowth from rhizomes. At this date, the most effective treatments were the ones with Fusion (Trts. 1 and 2), Fusilade II (Trts. 3, 4, and 7), Outrider alone (Trts. 8 and 9), Finale (Trt. 12), Clearcast (Trt. 14), Plateau (Trt. 15), and Journey (Trt. 16), with 83 to 94% johnsongrass control. At the final assessment date (303 DAT), the most effective treatments were the high rate of Fusion (Trt. 2), the Fusilade II treatments (Trts. 3 and 4), three of the Outrider treatments (Trts. 9, 11, and 12), Clearcast (Trt. 14), Plateau (Trt. 15), Journey (Trt. 16), and Pastora (Trt. 17), with 77 to 93% johnsongrass control.

Severe fescue damage was evident 14 DAT with the Finale, Roundup, and Journey treatments (Trts. 12, 13, and 16) (Table 4) and which became more severe for the Roundup and Journey treatments 46 DAT while the Finale treatment (Trt. 12) had largely recovered. Other treatments showing greater damage 46 DAT included the Acclaim Extra + Fusilade II combination (Trt. 7), Clearcast (Trt. 14) and Pastora (Trt. 17). Treatments which had grass stands less dense than control 369 DAT included Roundup, Journey, and Pastora (Trt. 13, 16, and 17).

There were differences in johnsongrass control between the two locations. One concern with combining a fast acting herbicide, like MSMA, with a slower acting one, like Outrider, (Trt. 11) is that long term efficacy will be reduced. However, this was not observed at either location. Tall fescue damage was not affected by these combination treatments either.

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Table 1. Treatments and Active Ingredients for Johnsongrass Control Trials

Trt. No.	Product Name	Rate	Rate Unit	Active Ingredient(s)	ai Rate (per acre)
1	Fusion Activator 90	7 0.25	FL OZ/A % V/V	fluazifop + fenoxaprop	1.75 oz + 0.49 oz
2	Fusion Activator 90	9 0.25	FL OZ/A % V/V	fluazifop + fenoxaprop	2.25 oz + 0.63 oz
3	Fusilade II Activator 90	6 0.25	FL OZ/A % V/V	fluazifop	1.5 oz
4	Fusilade II Activator 90	12 0.25	FL OZ/A % V/V	fluazifop	3 oz
5	Acclaim Extra Activator 90	20 0.25	FL OZ/A % V/V	fenoxaprop	1.4 oz
6	Acclaim Extra Activator 90	39 0.25	FL OZ/A % V/V	fenoxaprop	2.78 oz
7	Acclaim Extra Fusilade II COC	7 14 1	FL OZ/A FL OZ/A % V/V	fenoxaprop fluazifop	0.5 oz 3.5 oz
8	Outrider Activator 90	0.75 0.25	OZ/A % V/V	sulfosulfuron	0.563 oz
9	Outrider Activator 90	1 0.25	OZ/A % V/V	sulfosulfuron	0.75 oz
10	MSMA	32	FL OZ/A	monosodium acid methanearsonate	24 oz
11	Outrider MSMA	0.75 32	OZ/A FL OZ/A	sulfosulfuron monosodium acid methanearsonate	0.563 oz 24 oz
12	Outrider Finale Activator 90	0.75 2 0.25	OZ/A QT/A % V/V	sulfosulfuron glufosinate	0.563 oz 8 oz
13	Roundup ProMax	22	FL OZ/A	glyphosate	12.4 oz ae
14	Clearcast MSO	32 1	FL OZ/A % V/V	imazamox	4 oz ae
15	Plateau MSO	8 1	FL OZ/A % V/V	imazapic	2 oz ae
16	Journey MSO	21.3 1	FL OZ/A % V/V	imazapic + glyphosate	2 oz ae + 4 oz ae
17	Pastora Activator 90	1 0.25	OZ/A % V/V	nicosulfuron + metsulfuron	0.562 oz + 0.15 oz
18	Nontreated Check				

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Table 2: Treatments and Results for Johnsongrass Control Trial at Spindletop

Trt. No.	Product Name	Rate	Rate Unit	% Control		
				14 DAT	46 DAT	369 DAT
1	Fusion Activator 90	7 0.25	FL OZ/A % V/V	62 <i>cd</i>	65 <i>cdef</i>	43 <i>cd</i>
2	Fusion Activator 90	9 0.25	FL OZ/A % V/V	62 <i>cd</i>	75 <i>bcde</i>	33 <i>d</i>
3	Fusilade II Activator 90	6 0.25	FL OZ/A % V/V	25 <i>fgh</i>	37 <i>hij</i>	48 <i>cd</i>
4	Fusilade II Activator 90	12 0.25	FL OZ/A % V/V	37 <i>ef</i>	57 <i>efgh</i>	47 <i>cd</i>
5	Acclaim Extra Activator 90	20 0.25	FL OZ/A % V/V	53 <i>cde</i>	70 <i>bcdef</i>	28 <i>d</i>
6	Acclaim Extra Activator 90	39 0.25	FL OZ/A % V/V	68 <i>bc</i>	80 <i>abcd</i>	30 <i>d</i>
7	Acclaim Extra Fusilade II COC	7 14 1	FL OZ/A FL OZ/A % V/V	50 <i>de</i>	63 <i>defg</i>	63 <i>bc</i>
8	Outrider Activator 90	0.75 0.25	OZ/A % V/V	18 <i>gh</i>	43 <i>ghij</i>	67 <i>ab</i>
9	Outrider Activator 90	1 0.25	OZ/A % V/V	25 <i>fgh</i>	37 <i>hij</i>	82 <i>ab</i>
10	MSMA	32	FL OZ/A	87 <i>a</i>	78 <i>abcd</i>	97 <i>a</i>
11	Outrider MSMA	0.75 32	OZ/A FL OZ/A	83 <i>ab</i>	88 <i>ab</i>	96 <i>a</i>
12	Outrider Finale Activator 90	0.75 2 0.25	OZ/A QT/A % V/V	88 <i>a</i>	85 <i>abc</i>	63 <i>bc</i>
13	Roundup ProMax	22	FL OZ/A	87 <i>a</i>	98 <i>a</i>	87 <i>ab</i>
14	Clearcast MSO	32 1	FL OZ/A % V/V	17 <i>ghi</i>	30 <i>j</i>	45 <i>cd</i>
15	Plateau MSO	8 1	FL OZ/A % V/V	22 <i>fgh</i>	28 <i>j</i>	77 <i>ab</i>
16	Journey MSO	21.3 1	FL OZ/A % V/V	32 <i>fg</i>	52 <i>fghi</i>	83 <i>ab</i>
17	Pastora Activator 90	1 0.25	OZ/A % V/V	10 <i>hi</i>	35 <i>ij</i>	75 <i>ab</i>
18	Nontreated Check			0 <i>i</i>	0 <i>k</i>	0 <i>e</i>

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

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Table 3: Treatments and Results for Johnsongrass Control Trial near Camp Nelson

Trt. No.	Product Name	Rate	Rate Unit	% Control		
				14 DAT	42 DAT	303 DAT
1	Fusion Activator 90	7 0.25	FL OZ/A % V/V	65 <i>a</i>	92 <i>ab</i>	60 <i>def</i>
2	Fusion Activator 90	9 0.25	FL OZ/A % V/V	65 <i>a</i>	95 <i>a</i>	77 <i>abcde</i>
3	Fusilade II Activator 90	6 0.25	FL OZ/A % V/V	65 <i>a</i>	88 <i>ab</i>	83 <i>abc</i>
4	Fusilade II Activator 90	12 0.25	FL OZ/A % V/V	65 <i>a</i>	91 <i>ab</i>	78 <i>abcd</i>
5	Acclaim Extra Activator 90	20 0.25	FL OZ/A % V/V	72 <i>a</i>	80 <i>bc</i>	72 <i>bcdef</i>
6	Acclaim Extra Activator 90	39 0.25	FL OZ/A % V/V	75 <i>a</i>	80 <i>bc</i>	70 <i>bcdef</i>
7	Acclaim Extra Fusilade II COC	7 14 1	FL OZ/A FL OZ/A % V/V	72 <i>a</i>	87 <i>abc</i>	72 <i>bcdef</i>
8	Outrider Activator 90	0.75 0.25	OZ/A % V/V	45 <i>b</i>	92 <i>ab</i>	55 <i>f</i>
9	Outrider Activator 90	1 0.25	OZ/A % V/V	42 <i>bc</i>	91 <i>ab</i>	77 <i>abcde</i>
10	MSMA	32	FL OZ/A	30 <i>bc</i>	50 <i>d</i>	65 <i>cdef</i>
11	Outrider MSMA	0.75 32	OZ/A FL OZ/A	45 <i>b</i>	73 <i>c</i>	88 <i>ab</i>
12	Outrider Finale Activator 90	0.75 2 0.25	OZ/A QT/A % V/V	75 <i>a</i>	86 <i>abc</i>	83 <i>abc</i>
13	Roundup ProMax	22	FL OZ/A	47 <i>b</i>	80 <i>bc</i>	57 <i>ef</i>
14	Clearcast MSO	32 1	FL OZ/A % V/V	32 <i>bc</i>	83 <i>abc</i>	82 <i>abc</i>
15	Plateau MSO	8 1	FL OZ/A % V/V	37 <i>bc</i>	92 <i>ab</i>	93 <i>a</i>
16	Journey MSO	21.3 1	FL OZ/A % V/V	30 <i>bc</i>	94 <i>a</i>	87 <i>ab</i>
17	Pastora Activator 90	1 0.25	OZ/A % V/V	25 <i>c</i>	80 <i>bc</i>	77 <i>abcde</i>
18	Nontreated Check			0 <i>d</i>	0 <i>e</i>	0 <i>g</i>

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

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Table 4: Treatments and Results for Fescue Damage Trial at Spindletop

Trt. No.	Product Name	Rate	Rate Unit	Tall Fescue Color (0-9)		Stand (0-9)
				14 DAT	46 DAT	369 DAT
1	Fusion Activator 90	7 0.25	FL OZ/A % V/V	6.0 c	7.5 abc	8.7 a
2	Fusion Activator 90	9 0.25	FL OZ/A % V/V	6.0 c	7.0 bc	7.7 ab
3	Fusilade II Activator 90	6 0.25	FL OZ/A % V/V	6.3 bc	8.0 a	8.0 ab
4	Fusilade II Activator 90	12 0.25	FL OZ/A % V/V	6.3 bc	6.5 c	7.5 ab
5	Acclaim Extra Activator 90	20 0.25	FL OZ/A % V/V	6.8 abc	7.7 ab	8.0 ab
6	Acclaim Extra Activator 90	39 0.25	FL OZ/A % V/V	7.3 ab	7.5 abc	7.0 ab
7	Acclaim Extra Fusilade II COC	7 14 1	FL OZ/A FL OZ/A % V/V	7.0 abc	5.3 d	6.5 abc
8	Outrider Activator 90	0.75 0.25	OZ/A % V/V	6.3 bc	8.0 a	7.3 ab
9	Outrider Activator 90	1 0.25	OZ/A % V/V	7.0 abc	7.2 abc	7.5 ab
10	MSMA	32	FL OZ/A	7.0 abc	8.0 a	7.7 ab
11	Outrider MSMA	0.75 32	OZ/A FL OZ/A	6.3 bc	7.3 abc	8.0 ab
12	Outrider Finale Activator 90	0.75 2 0.25	OZ/A QT/A % V/V	1.0 e	7.5 abc	8.3 a
13	Roundup ProMax	22	FL OZ/A	0.8 e	0.5 g	4.0 c
14	Clearcast MSO	32 1	FL OZ/A % V/V	6.2 bc	2.0 ef	8.0 ab
15	Plateau MSO	8 1	FL OZ/A % V/V	6.0 c	5.3 d	8.0 ab
16	Journey MSO	21.3 1	FL OZ/A % V/V	4.0 d	1.7 f	4.0 c
17	Pastora Activator 90	1 0.25	OZ/A % V/V	6.3 bc	2.7 e	5.7 bc
18	Nontreated Check			8.0 a	8.0 a	9.0 a

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

Japanese Stiltgrass Control Trial at Fort Knox

Introduction

Japanese stiltgrass (*Microstegium vimineum*) is an invasive sprawling, dense, mat-forming annual grass, native to Asia. It is very shade tolerant but will quickly take advantage of extra sunlight and is common in forest edges, roadsides, trailsides, and disturbed areas such as skid trails (timber harvest). It's a prolific seed producer and humans and machinery readily spread the seed. The seed remains viable in the soil for 3 years. Successful management of stiltgrass requires a combination of control of existing plants before they produce seed and new plants coming up from the seedbank. This trial examined the efficacy of some selective herbicide control options for stiltgrass.

Materials and Methods

The trial was established September 24, 2013 on a skid trail within the forested Hunt Area 19 on Fort Knox. The trial had 9 treatments with 3 replications arranged in a randomized complete block design with 5 ft by 20 ft plots. Application was at 20 gallons /acre. The height of the stiltgrass plants was 16 to 27 inches, with some seedheads emerged in the areas receiving more sunshine. The early summer application was on July 15, 2014 when the stiltgrass plants were 10 to 20 inches tall. Stiltgrass control was assessed 14 (10/8/2013), 294 (7/15/2014), and 393 (10/22/2014) days after treatment (DAT). The last assessment was 99 DAT for the early summer application. Data on green vegetative cover (0-100%) were collected 294 and 393 (99) DAT. Data were analyzed using ARM software and treatment means were compared using Fisher's LSD at $p = 0.05$.

Table 1 lists the treatments, active ingredients and application rates. Treatments 1 to 7 were applied in fall 2013, while Trt. 8 was applied in early summer 2014. All the treatments included products that had post-emerge and pre-emerge activity to control emerged stiltgrass and germinating seeds. The Fusilade II treatments would be the most selective with little damage to non-target broadleaf species. The expected period of pre-emerge activity varied among the treatments. The Pendulum AquaCap treatment (Trt. 8) was applied in early summer as its period of effectiveness is not as long as ProClipse (Trts. 5 and 7).

Results and Discussion

Most of the treatments, except for Plateau (Trt. 1), controlled stiltgrass greater than 96% 294 DAT (Table 2). However, the Plateau and Fusilade II (Trts. 4 and 5) treated plots had the most green vegetative cover 294 DAT. The OustExtra (Trt. 2), Fusilade II (Trt. 4, 5, and 8), and ProClipse (Trt. 5 and 7) treatments still had the greatest control (89 – 97%) 393 DAT. However, there was no difference in green vegetative cover between the Plateau and Milestone treatments and the control plots 393 DAT. The lowest vegetative cover was with the OustExtra (Trt. 2), ProClipse (Trt 5 and 7), and Pendulum AquaCap (Trt. 8 at 99 DAT) treatments. Final assessments will be done in 2015. There are a number of herbicide options which are effective for stiltgrass control and which would be selective for desired vegetation.

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Table 1. Treatments and Active Ingredients for Japanese Stiltgrass Control Trial

Trt. No.	Product Name	Rate	Rate Unit	Active Ingredient(s)	AI Rate (per acre)
1	Plateau Activator 90	4 0.25	FL OZ/A % V/V	imazapic	1 oz ae
2	OustExtra Activator 90	3 0.25	OZ/A % V/V	sulfometuron + metsulfuron	1.69 oz + 0.45 oz
3	Milestone VM Activator 90	6 0.25	FL OZ/A % V/V	aminopyralid	1.5 oz ae
4	Fusilade II Activator 90	24 0.25	FL OZ/A % V/V	fluazifop	6 oz
5	Fusilade II ProClipse Activator 90	24 2 0.25	FL OZ/A LB/A % V/V	fluazifop prodiamine	6 oz 20.8 oz
6	Streamline Activator 90	4.75 0.25	OZ/A % V/V	aminocyclopyrachlor + metsulfuron	1.88 oz + 0.60 Oz
7	Roundup ProMax ProClipse Activator 90	22 2 0.25	FL OZ/A LB/A % V/V	glyphosate prodiamine	12.38 oz ae 20.8 oz
8	Fusilade II Pendulum AquaCap Activator 90	24 4.2 0.25	OZ/A QT/A % V/V	fluazifop pendimethalin	6 oz 63.8 oz
9	Nontreated Check				

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Table 2. Treatments and Results for Japanese Stiltgrass Control Trial

Trt. No.	Product Name	Rate	Rate Unit	Application Timing	% Control			% Green Veg.	
					14 DAT	294 DAT	393 DAT	294 DAT	393 DAT
1	Plateau Activator 90	4 0.25	FL OZ/A % V/V	Fall	13 <i>de</i>	72 <i>b</i>	40 <i>d</i>	57 <i>b</i>	75 <i>ab</i>
2	OustExtra Activator 90	3 0.25	OZ/A % V/V	Fall	13 <i>de</i>	99 <i>a</i>	94 <i>abc</i>	23 <i>c</i>	28 <i>e</i>
3	Milestone VM Activator 90	6 0.25	FL OZ/A % V/V	Fall	33 <i>cd</i>	97 <i>a</i>	78 <i>c</i>	35 <i>c</i>	63 <i>abc</i>
4	Fusilade II Activator 90	24 0.25	FL OZ/A % V/V	Fall	40 <i>bc</i>	97 <i>a</i>	89 <i>abc</i>	60 <i>b</i>	57 <i>bcd</i>
5	Fusilade II ProClipse Activator 90	24 2 0.25	FL OZ/A LB/A % V/V	Fall	25 <i>cd</i>	99 <i>a</i>	99 <i>a</i>	57 <i>b</i>	43 <i>cde</i>
6	Streamline Activator 90	4.75 0.25	OZ/A % V/V	Fall	60 <i>b</i>	97 <i>a</i>	81 <i>bc</i>	35 <i>c</i>	57 <i>bcd</i>
7	Roundup ProMax ProClipse Activator 90	22 2 0.25	FL OZ/A LB/A % V/V	Fall	98 <i>a</i>	99 <i>a</i>	97 <i>ab</i>	22 <i>c</i>	30 <i>e</i>
8*	Fusilade II Pendulum AquaCap Activator 90	24 4.2 0.25	OZ/A QT/A % V/V	Summer	0 <i>e</i>	0 <i>c</i>	97 <i>ab</i>	85 <i>a</i>	37 <i>de</i>
9	Nontreated Check				0 <i>e</i>	0 <i>c</i>	0 <i>e</i>	82 <i>a</i>	83 <i>a</i>

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

* Treatment 8 was unsprayed at 14 and 294 DAT. Assessment at 393 DAT was 99 days after application for this treatment.

Observations from a Japanese Knotweed Control Demonstration

Japanese knotweed (*Polygonum cuspidatum*) is a tall perennial canelike shrub. The hollow-jointed, reddish bamboo-like stems survive one season while the rhizomes persist over winter. It spreads along streams mostly by stem and rhizome fragments and can dominate the riparian habitat. It also spreads along roadsides through maintenance mowing. Herbicides are a key component for management of this invasive plant.

Plots, to demonstrate some herbicide options for Japanese knotweed management, were established on a municipal property in Morehead with the assistance of Bob Marsh, Rowan County Extension Agent. Nine 10 ft by 30 ft plots were marked out and sprayed on July 15, 2013 at 25 gal/acre when the knotweed was 24 to 42 inches high (Table 1). Plots 1 to 4 received one application while plots 6 to 9 received two applications. A black locust tree was in the control plot 5 so the Habitat plots were placed as far from it as possible to reduce the risk of damaging it. The second application was made on September 5, 2013 for plots 6 to 8. A second application was not warranted on the Habitat plot as we had near total knotweed control. Notes were taken on knotweed control 52 (9/5/2013), 87 (10/10/2013), and 312 (5/23/2014) days after the first application (DAT). For plots 6 to 8, the assessments were also made 35 and 260 days after the second application.

These plots were not replicated so one needs to use these observations with care. The Habitat (imazapyr) plots (Plots 1 and 9) had good control of Japanese knotweed and most other vegetation at all assessment dates (Table 1). The Rodeo (glyphosate) plots (Plots 3 and 8) had little visual Japanese knotweed injury 52 DAT although they it had stopped growing and was not flowering, unlike the Japanese knotweed in the control plots. However, there was 99% control of the Japanese knotweed in the Rodeo plots 312 DAT. The combination of Rodeo with Garlon 3A (triclopyr) (Plots 4 and 6) injured and visually controlled the Japanese knotweed more than Rodeo alone 52 DAT but less (40 to 60%) than Rodeo alone 312 DAT. This may be a case where the rapid leaf damage from the triclopyr interfered with the translocation of the glyphosate to the rhizomes.

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Table 1: Treatments and Observations on Demonstration Plots for Knotweed Control at Morehead

Plot No.	Product Name	Rate	Rate Unit	Number of Applications	% Control (Knotweed)			Knotweed Ht (in)
					52 DAT	87 DAT	312 DAT	312 DAT
1	Habitat Activator 90	3 0.25	PT/A % V/V	1	95	98	99	12
2	Garlon 3A Activator 90	1.5 0.25	GAL/A % V/V	1	60	85	30	48
3	Rodeo Activator 90	3 0.25	QT/A % V/V	1	10	20	99	24
4	Rodeo Garlon 3A Activator 90	3 1.5 0.25	QT/A GAL/A % V/V	1	75	80	40	40
5	Nontreated Check			0	0	0	0	72
6	Rodeo Garlon 3A Activator 90	3 1.5 0.25	QT/A GAL/A % V/V	2	90	99	60	30
7	Garlon 3A Activator 90	1.5 0.25	GAL/A % V/V	2	60	95	50	40
8	Rodeo Activator 90	3 0.25	QT/A % V/V	2	10	70	99	15
9	Habitat Activator 90	3 0.25	PT/A % V/V	1	80	98	99	12

Observations from NRVMA Bareground Demonstration Plots

Demonstration plots were established at the Westport Road and I-265 interchange for the National Roadside Vegetation Management Association meeting held in September 2013. There is increasing interest in fall applications for bareground so both fall and spring applications treatments were suggested by industry representatives.

Thirteen 10 ft by 20 ft plots were established December 6, 2012 for the fall application and fifteen plots on May 29, 2013 for the spring application. Applications were at 20 gallons per acre and all treatments included the adjuvant Activator 90 at 0.25% v/v. There was heavy rainfall after the fall application. Assessment of % bareground was recorded for the plots July 30, 2013 which was 236 days after treatment (DAT) for the fall application and 62 DAT for the spring application. Treatments and observations are listed in Table 1 for the fall application and Table 2 for the spring application. Sahara was included as a “standard” treatment (Trt. 13 in Table 1 and Trt. 15 in Table 2). Almost all the treatments included glyphosate to control existing vegetation. Fall treatments 1 and 2 did not include glyphosate and had more perennial grass than other plots (Table 1).

These plots were not replicated so one needs to use these observations with care as there was considerable variation in existing vegetation at the time of application among the plots. However, some interesting observations were made on adjacent plots. Plot 3 treated with Esplande alone in the fall had many young pear seedlings while plot 4 with Esplande plus Streamline did not (Table 1). The aminocyclopyrachlor in Streamline has good activity on woody species. There were areas of bermudagrass among the spring application plots and many of the treatments were not effective in controlling it. This contributed to the low % bareground ratings in plots 1, 2, 3, 9, 10, and 12 (Table 2). Plot 13 also had bermudagrass but had better control than plot 12 and this may be due to the imazapyr in the Viewpoint included in plot 13. Fall bareground applications can be effective.

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Table 1. Treatments, Active Ingredients, and Observations (236 DAT) for NRVMA Fall Bareground Demo Plots (part 1)

Plot No.	Product(s)	Rate/acre	% Bareground	Active Ingredients (MOA)	Rates (ai/acre)
1	Pyresta	24 fl oz	50	2,4-D (Synthetic Auxin) + pyraflufen-ethyl (PPG oxidase inhibitor)	10.5 oz ae + 0.05 oz
	Vanquish ProClipse	12 fl oz 2 lb		dicamba (Synthetic Auxin) prodiamine (Mitosis Inhibitor)	6 oz 41.6 oz
2	Patron 170 ProClipse	4 pt 2 lb	70	2,4-D + dichlorprop (Synthetic Auxin)	13.7 oz ae + 7 oz 41.6 oz
3	Esplanade	5 fl oz	80	indaziflam (Cellulose Biosynthesis Inhibitor)	1.05 oz
	Roundup ProMax	1.3 qt		glyphosate (EPSP Inhibitor)	23.4 oz ae
4	Esplanade	5 fl oz	90	aminocyclopyrachlor (Synthetic Auxin) + metsulfuron (ALS Inhibitor)	1.05 oz
	Streamline	8 oz			3.2 oz + 1 oz
	Roundup ProMax	1.3 qt			23.4 oz ae
5	Esplanade	5 fl oz	97	aminopyralid (Synthetic Auxin)	1.05 oz
	Milestone VM	7 fl oz			1.75 oz
	Roundup ProMax	1.3 qt			23.4 oz ae
6	Esplanade	5 fl oz	99	sulfometuron + metsulfuron (ALS Inhibitors)	1.05 oz
	OustExtra	4 oz			2.25 oz + 0.6 oz
	Roundup ProMax	1.3 qt			23.4 oz ae
7	Esplanade	5 fl oz	95	sulfometuron (ALS Inhibitor) glyphosate (EPSP Inhibitor)	1.05 oz
	Milestone VM	7 fl oz			1.75 oz
	Oust	3 oz			2.25 oz
	Accord XRT	1 qt			16 oz ae
8	Esplanade	5 fl oz	99.5	imazapic (ALS Inhibitor)	1.05 oz
	Milestone VM	7 fl oz			1.75 oz
	Plateau	6 fl oz			1.5 oz
	Accord XRT	1 qt			16 oz ae
9	Perspective	10 oz	100	aminocyclopyrachlor (Synthetic Auxin) + chlorsulfuron (ALS Inhibitor)	3.95 oz + 1.58 oz
	ProClipse	2 lb			41.6 oz
	Roundup ProMax	1.3 qt			23.4 oz ae
10	Perspective	10 oz	98	bromacil + diuron (Photosystem II Inhibitors)	3.95 oz + 1.58 oz
	Krovar	8 lb			51.2 oz + 51.2 oz
	Roundup ProMax	1.3 qt			23.4 oz ae

All herbicide treatments included the adjuvant, Activator 90 at 0.25% v/v.
Active ingredients listed for the first instance in the table of each product.

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Table 1. Treatments, Active Ingredients, and Observations (236 DAT) for NRVMA Fall Bareground Demo Plots (part 2)

Plot No.	Product(s)	Rate/acre	% Bareground	Active Ingredients (MOA)	Rates (ai/acre)
11	Perspective Esplanade Roundup ProMax	10 oz 5 fl oz 1.3 qt	85		3.95 oz + 1.58 oz 1.05 oz 23.4 oz ae
12	Viewpoint Oust ProClipse Roundup ProMax	16 oz 3 oz 2 lb 1.3 qt	80	aminocyclopyrachlor (Synthetic Auxin) + metsulfuron + imazapyr (ALS Inhibitors)	3.65 oz + 1.17 oz + 5.06 oz 2.25 oz 41.6 oz 23.4 oz ae
13	Sahara Roundup ProMax	10 lb 1.3 qt	75	diuron (Photosystem II Inhibitor) + imazapyr (ALS inhibitor)	99.6 oz + 12.45 oz 23.4 oz ae

*All herbicide treatments included the adjuvant, Activator 90 at 0.25% v/v.
Active ingredients listed for the first instance in the table of each product.*

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Table 2. Treatments, Active Ingredients, and Observations (62 DAT) for NRVMA Spring Bareground Demo Plots (part 1)

Plot No.	Product(s)	Rate/acre	% Bareground	Active Ingredients (MOA)	Rates (ai/acre)
1	Pyresta	18 fl oz	20	2,4-D (Synthetic Auxin) + pyraflufen-ethyl (PPG oxidase inhibitor)	7.9 oz ae + 0.04 oz
	ProClipse	2 lb		prodiamine (Mitosis Inhibitor)	41.6 oz
	Razor	2 pt		glyphosate (EPSP Inhibitor)	12 oz ae
2	E-2	3 pt	25	2,4-D + fluroxypyr + dicamba (Synthetic Auxins)	19.2 oz ae + 2.4 oz ae + 2.4 oz ae
	ProClipse	2 lb			41.6 oz
	Razor	2 pt			12 oz ae
3	Perspective	9 oz	40	aminocyclopyrachlor (Synthetic Auxin) + chlorsulfuron (ALS Inhibitor)	3.56 oz + 1.42 oz
	ProClipse	2 lb			41.6 oz
	Razor	2 pt			12 oz ae
4	Esplanade	5 fl oz	90	indaziflam (Cellulose Biosynthesis Inhibitor)	1.05 oz
	Roundup	1.3 qt		glyphosate (EPSP Inhibitor)	23.4 oz ae
	ProMax				
5	Esplanade	5 fl oz	80	aminocyclopyrachlor (Synthetic Auxin) + metsulfuron (ALS Inhibitor)	1.05 oz
	Streamline	8 oz			3.2 oz + 1 oz
	Roundup ProMax	1.3 qt			23.4 oz ae
6	Esplanade	5 fl oz	75	aminopyralid (Synthetic Auxin)	1.05 oz
	Milestone VM	7 fl oz			1.75 oz
	Roundup	1.3 qt			23.4 oz
	ProMax				
7	Esplanade	5 fl oz	100	sulfometuron + metsulfuron (ALS Inhibitors)	1.05 oz
	OustExtra	4 oz			2.25 oz + 0.06 oz
	Roundup	1.3 qt			23.4 oz
	ProMax				
8	Esplanade	5 fl oz	85	sulfometuron (ALS Inhibitor) glyphosate (EPSP Inhibitor)	1.05 oz
	Milestone VM	7 fl oz			1.75 oz
	Oust	3 oz			2.25 oz
	Accord XRT	1 qt			16 oz ae
9	Esplanade	5 fl oz	20	imazapic (ALS Inhibitor)	1.05 oz
	Milestone VM	7 fl oz			1.75 oz
	Plateau	6 fl oz			1.5 oz
	Accord XRT	1 qt			16 oz ae

All herbicide treatments included the adjuvant, Activator 90 at 0.25% v/v.
Active ingredients listed for the first instance in the table of each product.

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Table 2. Treatments, Active Ingredients, and Observations (62 DAT) for NRVMA Spring Bareground Demo Plots (part 2)

Plot No.	Product(s)	Rate/acre	% Bareground	Active Ingredients (MOA)	Rates (ai/acre)
10	Perspective ProClipse Oust Roundup ProMax	10 oz 2.3 lb 3 oz 1.3 qt	40		3.95 oz + 1.58 oz 47.8 oz 2.25 oz 23.4 oz ae
11	Viewpoint Krovar Roundup ProMax	16 oz 8 lb 1.3 qt	80	aminocyclopyrachlor (Synthetic Auxin) + metsulfuron + imazapyr (ALS Inhibitors) bromacil + diuron (Photosystem II Inhibitors)	3.65 oz + 1.17 oz + 5.06 oz 51.2 oz + 51.2 oz 23.4 oz ae
12	Perspective Esplanade Roundup ProMax	10 oz 5 fl oz 1.3 qt	60		3.95 oz + 1.58 oz 1.05 oz 23.4 oz ae
13	Viewpoint Oust ProClipse Roundup ProMax	16 oz 2 oz 2 lb 1.3 qt	100		3.65 oz + 1.17 oz + 5.06 oz 1.5 oz 41.6 oz 23.4 oz ae
14	Viewpoint Esplanade Roundup ProMax	16 oz 5 fl oz 1.3 qt	99		3.65 oz + 1.17 oz + 5.06 oz 1.05 oz 23.4 oz ae
15	Sahara Roundup ProMax	10 lb 1.3 qt	97	diuron (Photosystem II Inhibitor) + imazapyr (ALS inhibitor)	99.6 oz + 12.45 oz 23.4 oz ae

All herbicide treatments included the adjuvant, Activator 90 at 0.25% v/v.
Active ingredients listed for the first instance in the table of each product.

Observations from NRVMA Seedhead Suppression Demonstration Plots

Demonstration plots were established on tall fescue turf at the Sawyer State Park in Louisville, KY, for the National Roadside Vegetation Management Association meeting held in September 2013. There is interest in fall applications for broadleaf control and tall fescue seedhead suppression so industry representatives suggested both fall and spring treatments.

Four 15 ft by 30 ft plots were established December 14, 2012 for the fall applications and eight plots on April 30, 2013 for the spring applications. Applications were at 20 gallons per acre onto a 10 ft wide swath within each of the plots leaving a running 5 ft wide unsprayed check strip between each of the plots. All treatments included the adjuvant Activator 90 at 0.25% v/v. The percentage of the tall fescue heading and plant height were recorded on June 4, 2013 which was 172 days after treatment (DAT) for the fall applications and 35 DAT for the spring applications. Percent fescue injury was assessed on the spring applied plots as well. Treatments and observations are listed in Table 1 for the fall application and Table 2 for the spring application. The Plateau (Plot 7) and Stronghold (Plot 8) treatments were included as industry standards in the spring application (Table 2).

These plots were not replicated so one needs to use these observations with care. In the fall applied Plateau plots (Plots 1 and 2), there were no fescue seedheads as there were almost no fescue plants left in these plots (Table 1). All the spring treatments suppressed tall fescue seedheads but the Plateau treatment (Plot 7) caused the greatest tall fescue injury while the Powerflex and Stronghold treatments (Plots 6 and 8) had the least injury. Spring applications for seedhead suppression are more reliable than fall applications.

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Table 1. Treatments, Active Ingredients, and Observations (172 DAT) for NRVMA Fall Seedhead Suppression Demo Plots

Plot No.	Product(s)	Rate/acre	Tall Fescue (ht)	% Heading	Active Ingredients (MOA)	Rates (ai/acre)
1	Milestone Escort Plateau	7 fl oz 0.5 oz 4 oz	14	0	aminopyralid (Synthetic Auxin) metsulfuron (ALS inhibitor) imazapic (ALS Inhibitor)	1.75 oz 0.3 oz 1 oz
2	Opensight Plateau	3 oz 4 oz	12	0	aminopyralid + metsulfuron	1.58 oz + 0.28 oz 1 oz
3	Perspective	4.5 oz	53	100	aminocyclopyrachlor (Synthetic Auxin) + chlorsulfuron (ALS Inhibitor)	1.78 oz + 0.71 oz
4	Streamline	4.5 oz	44	10	aminocyclopyrachlor + metsulfuron	1.78 oz + 0.57 oz

*All herbicide treatments included the adjuvant, Activator 90 at 0.25% v/v.
Active ingredients listed for the first instance in the table of each product.*

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Table 2. Treatments, Active Ingredients, and Observations (35 DAT) for NRVMA Spring Seedhead Suppression Demo Plots

Plot No.	Product(s)	Rate/acre	Tall Fescue (ht)	% Heading	% Injury	Active Ingredients (MOA)	Rates (ai/acre)
1	Milestone Escort Plateau	7 fl oz 0.5 oz 4 oz	10	0	15	aminopyralid (Synthetic Auxin) metsulfuron (ALS inhibitor) imazapic (ALS Inhibitor)	1.75 oz 0.3 oz 1 oz
2	Opensight Plateau	3 oz 4 oz	9	0	15	aminopyralid + metsulfuron	1.58 oz + 0.28 oz 1 oz
3	Perspective Plateau	3.25 oz 2 fl oz	9	0	15	aminocyclopyrachlor (Synthetic Auxin) + chlorsulfuron (ALS Inhibitor)	1.28 oz + 0.51 oz 0.5 oz
4	Streamline Plateau	3 oz 3 fl oz	9	0	20	aminocyclopyrachlor + metsulfuron	1.19 oz + 0.38 oz 0.75 oz
5	Perspective Milestone Plateau	3 oz 5 fl oz 3 fl oz	10	0	15		1.19 oz + 0.47 oz 1.25 oz 0.75 oz
6	Powerflex Milestone	2.85 oz 5 fl oz	10	0	5	pyroxsulam (ALS Inhibitor)	0.21 oz 1.25 oz
7	Plateau Formula 40	4 fl oz 2 qt	9	0	25	2,4-D (Synthetic Auxin)	1 oz 29.4 oz ae
8	Stronghold Hi-Dep IVM	12 fl oz 2 qt	11	0	5	mefluidide (Not Classified) + imazethapyr + imazapyr (ALS Inhibitors) 2,4-D (Synthetic Auxin)	2.2 oz ae + 0.53 oz ae + 0.015 oz ae 30.4 oz ae

All herbicide treatments included the adjuvant, Activator 90 at 0.25% v/v.
Active ingredients listed for the first instance in the table of each product.

Observations from NRVMA Woody Vegetation Control Demonstration Plots

Demonstration plots were established at the Sawyer State Park in Louisville, KY, for the National Roadside Vegetation Management Association meeting held in September 2013. Woody vegetation control is a part of roadside vegetation management and we wanted to include demonstration plots on this subject as part of the NRVMA tour. Treatments were suggested by industry representatives for the demonstration.

Seven 15 ft sections of bush honeysuckle growing along the forest edge were marked for the high volume dormant stem plots. Treatments were applied at 100 gallons per acre on April 16, 2013 (Table 1). The bush honeysuckle had already started to leaf out so application was later than intended. The BK800 + Garlon 4 treatment (Plot 4) is the one used by the KY Transportation Cabinet. Control was assessed on July 30, 2013, 91 days after treatment (DAT).

These plots were not replicated so one needs to use these observations with care. The Viewpoint treatments (Plots 2 and 5) controlled bush honeysuckle less than other treatments (Table 1). Adding Garlon 4 to Viewpoint (Plot 6) resulted in good control. There was dense growth of Japanese stiltgrass along the forest edge. Good pre-emergence control of this weed was observed in the Streamline + Garlon 4 plot (Plot 7).

Bush honeysuckle and Ailanthus trees were felled for cut stump applications and basal stem treatments were applied on April 16, 2013 (Table 2). All the treatments were effective. The treatments included water as well as basal oil as carriers. In treatments 3 to 5, aqueous herbicide formulations were used in basal oil with the addition of Activator 90 as an emulsifier.

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Table 1. Treatments, Active Ingredients and Observations (91 DAT) for NRVMA High Volume Dormant Stem Demo

Plot No.	Product(s)	Conc. / Rate	% Control	Active Ingredients (MOA)	Rates (ai per acre)
1	Garlon 4 Ultra Milestone Basal Oil	2% 0.5% 2%	90	triclopyr (Synthetic Auxin) aminopyralid (Synthetic Auxin)	128 oz 16 oz
2	Viewpoint Basal Oil	14 oz 2%	30	aminocyclopyrachlor (Synthetic Auxin) + metsulfuron + imazapyr (ALS Inhibitors)	3.19 oz + 1.02 oz + 4.42 oz
3	Streamline Garlon 4 Ultra Basal Oil	11 oz 2% 2%	95	aminocyclopyrachlor + metsulfuron (ALS Inhibitor)	4.35 oz + 1.39 oz 128 oz
4	BK800 Garlon 4 Ultra Basal Oil	1.5 gal 0.5 gal 4.0 gal	95	2,4-D + 2,4-DP + dicamba (Synthetic Auxins)	45.36 oz ae + 22.56 oz ae + 11.28 oz ae 32 oz
5	Viewpoint	12 oz	30		2.74 oz + 0.88 oz + 3.79 oz
6	Viewpoint Garlon 4	12 oz 6 qt	95		2.74 oz + 0.88 oz + 3.79 oz 96 oz
7	Streamline Garlon 4	10 oz 6 qt	95		3.95 oz + 1.26 oz 96 oz

Active ingredients listed for the first instance in the table of each product.

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Table 2. Treatments and Active Ingredients for NRVMA Cut Stump and Basal Stem Demonstrations

Trt. No.	Product(s)	Conc.	Active Ingredients (MOA)	Notes
1	Garlon 4 Ultra Milestone Signal (colorant)	20% 1% 0.75%	triclopyr (Synthetic Auxin) aminopyralid (Synthetic Auxin)	Applied as basal on Ailanthus tree.
2	Garlon 4 Ultra Milestone Signal (colorant)	20% 1% 0.75%	triclopyr (Synthetic Auxin) aminopyralid (Synthetic Auxin)	Applied cut stump on Bush Honeysuckle and Ailanthus.
3	Patron 170 Vanquish Activator 90 (as emulsifier) Bas-Oil Blue (colorant) Applied in basal oil	4% 2% 20% 1.5%	2,4-D + dichlorprop (Synthetic Auxins) dicamba (Synthetic Auxin)	Applied as basal on Ailanthus tree.
4	Method 240 SL Activator 90 (as emulsifier) Bas-Oil Blue (colorant) Applied in basal oil	7% 20% 1.5%	aminocyclopyrachlor (Synthetic Auxin)	Applied as basal on Ailanthus tree.
5	Method 240 SL Activator 90 (as emulsifier) Bas-Oil Blue (colorant) Applied in basal oil	7% 20% 1.5%	aminocyclopyrachlor (Synthetic Auxin)	Applied cut stump on Bush Honeysuckle and Ailanthus.

Active ingredients listed for the first instance in the table of each product.