

2014 Johnsongrass Control Trial in Princeton

Introduction

Johnsongrass (*Sorghum halepense*) is a perennial warm season grass, listed as a noxious weed in Kentucky, that is a common problem on right-of-ways. There are a number of herbicides labeled and available to control johnsongrass on right-of-ways. However, some of these are nonselective or are selective for johnsongrass but can still damage desirable cool season turf, such as tall fescue. One of the safer johnsongrass control herbicides to use on tall fescue is Fusion but a label change in 2012 made it unavailable for use on right-of-way sites. This trial is a continuation of the evaluation of a range of johnsongrass control/suppression options (alternatives to Fusion) and how they affect tall fescue.

Materials and Methods

The trial was established August 22, 2014 at the Princeton Research and Education Center. The trial had 18 treatments with 3 replications arranged in a randomized complete block design with 5 ft by 20 ft plots. Application was at 30 gallons /acre. The johnsongrass was 17 to 32 inches tall with an overall average canopy height of 26 inches and about 40% of plants had emerged seedheads. The field was mostly a mixture of tall fescue and bluegrass. Johnsongrass control was assessed 25 (9/16/2014), 61 (10/22/2014), and 305 (6/23/2015) days after treatment (DAT). Tall fescue damage (0 = dead to 9 = fully green; with unsprayed plots set at 8.0) was assessed 25 and 61 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 oz/A (Treatments 1 and 2). The labeled Fusilade II rates are 16 to 24 oz/A (Treatments 3 and 4). The Acclaim Extra label lists 20 oz/A per acre to control seedling johnsongrass 12 – 24 inches tall (Treatment 5); 39 oz/A to control rhizome johnsongrass 24 to 60 inches tall (Trt. 6); and a combination of Acclaim Extra plus Fusilade (0.5 plus 3.5 oz/A), for improved turfgrass tolerance and to control rhizome johnsongrass 10 to 25 inches tall (Treatment 7). The Outrider label rates for selective johnsongrass control in tall fescue turf are 0.75 to 1 oz/A (Treatments 8 and 9). Roundup (Treatment 13) and Journey (Treatment 16) are non-selective. Clearcast (Treatment 14) has an aquatic label and may be used close to waterways. The high rate of Plateau used in Treatment 15 will severely damage tall fescue. Pastora (Treatment 17) is only labeled for warm season pastures. MSMA can still be used on rights-of-way was included in these trials, but not in the 2012 trials. Treatment 10 is MSMA applied alone and Treatment 11 is MSMA applied in combination with Outrider at 0.75 oz/A. Outrider is slow to show symptoms, so a combination of Outrider with Finale (Treatment 12) was included to speed johnsongrass injury. A lower rate of Finale (1 pt/A) was used than in 2013 (2 qt/A).

Results and Discussion

The growth of the johnsongrass at this site was not as vigorous as in other trials or roadside locations. All the treatments controlled johnsongrass to some extent 25, 61, and 305 DAT (Table

2). The most effective treatments 25 DAT were MSMA alone (88% control, Treatment 10) and with Outrider (77% control, Treatment 11), Roundup ProMax (87% control, Treatment 13), Journey (75% control, Treatment 16), and the high rate (39 oz/A) of Acclaim Extra (70% control, Treatment 6).

At 61 DAT, all the selective treatments (Fusion, Fusilade II, Acclaim Extra, Outrider, Clearcast, MSMA or combinations of some of these) with the exceptions of Plateau (68%) and Pastora (63%), provided 70% or better johnsongrass control (Table 2). The nonselective treatments of Roundup Promax, Journey, and Outrider plus Finale gave 78% or better johnsongrass control. At the final assessment date (305 DAT), the most effective selective treatments were Fusilade II (24 oz/A, Treatment 4), Acclaim Extra (39 oz/A, Treatment 6), Clearcast (Treatment 14), Outrider alone or with MSMA (Treatments 8, 9, and 11), and MSMA alone (Treatment 10). Control with the nonselective treatments of Roundup ProMax (92% control), Journey (82% control), and Outrider plus Finale (72 % control) were statistically equivalent.

The majority of the treatments caused yellowing or other damage to the tall fescue 25 DAT (Table 2). The greatest injury occurred with treatments containing glyphosate (Treatments 13 and 16). Acclaim Extra alone (Treatments 5 and 6) and MSMA alone (Treatment 10) had the least yellowing. In 2013, a higher rate of Finale (4 oz/A) was used compared to that in this trial (1 oz/A, Treatment 12) and caused rapid injury to johnsongrass and other plants. This year there were no visible symptoms of glufosinate damage on any of the plants. By 61 DAT, tall fescue injured by the treatments had partially or fully recovered. Tall fescue treated with glyphosate (Treatments 13 and 16) or Clearcast (Treatment t. 14) had the most severe injury 61 DAT.

In summary, long term johnsongrass control was greater in this study compared to previous trials. Acclaim Extra, Outrider, and MSMA all provided good johnsongrass control the next year and minimal tall fescue damage two months after application. Fusilade II also gave good johnsongrass control but tall fescue injury was still evident from this treatment two months after application. Addition of Finale (1 pt/A) to Outrider did not improve johnsongrass control or increase tall fescue injury. Roundup Promax, Clearcast, and Journey all gave good to excellent johnsongrass control (82-92%) the year after treatment but were also, as expected, the most injurious to tall fescue. The damage to tall fescue by these treatments was severe and resulted in thin stands which allowed other weeds to dominate.

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Table 1. Treatments and Active Ingredients for Johnsongrass Control Trial

Treatment	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	16 0.25	FL OZ/A % V/V	fluazifop	4 oz
4	Fusilade II Activator 90	24 0.25	FL OZ/A % V/V	fluazifop	6 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 1 0.25	OZ/A PT/A % V/V	sulfosulfuron glufosinate	0.563 oz 2 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	Untreated Check				

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Table 2: Results for Johnsongrass Control Trial

Treatment	Product Name	Rate	Rate Unit	% Johnsongrass Control			Fescue Color (0-9) ¹	
				25 DAT ²	61 DAT	305 DAT	25 DAT	61 DAT
1	Fusion Activator 90	7 0.25	FL OZ/A % V/V	50 <i>defgh</i> ³	73 <i>cdef</i>	27 <i>e</i>	5.8 <i>bcd</i>	7.0 <i>abc</i>
2	Fusion Activator 90	9 0.25	FL OZ/A % V/V	53 <i>defg</i>	80 <i>abcde</i>	33 <i>e</i>	5.0 <i>de</i>	6.3 <i>bcd</i>
3	Fusilade II Activator 90	16 0.25	FL OZ/A % V/V	45 <i>efgh</i>	77 <i>bcde</i>	47 <i>de</i>	4.8 <i>de</i>	5.7 <i>de</i>
4	Fusilade II Activator 90	24 0.25	FL OZ/A % V/V	43 <i>efgh</i>	73 <i>cdef</i>	68 <i>abcd</i>	4.7 <i>de</i>	6.0 <i>cde</i>
5	Acclaim Extra Activator 90	20 0.25	FL OZ/A % V/V	57 <i>bcde</i>	78 <i>abcde</i>	33 <i>e</i>	7.2 <i>ab</i>	7.7 <i>a</i>
6	Acclaim Extra Activator 90	39 0.25	FL OZ/A % V/V	70 <i>abcd</i>	90 <i>a</i>	72 <i>abcd</i>	7.2 <i>ab</i>	8.0 <i>a</i>
7	Acclaim Extra Fusilade II COC	7 14 1	FL OZ/A FL OZ/A % V/V	50 <i>defgh</i>	73 <i>cdef</i>	48 <i>cde</i>	5.0 <i>de</i>	6.3 <i>bcd</i>
8	Outrider Activator 90	0.75 0.25	OZ/A % V/V	57 <i>bcde</i>	78 <i>abcde</i>	73 <i>abc</i>	5.3 <i>de</i>	7.3 <i>ab</i>
9	Outrider Activator 90	1 0.25	OZ/A % V/V	35 <i>fgh</i>	70 <i>def</i>	62 <i>bcd</i>	5.7 <i>cde</i>	7.0 <i>abc</i>
10	MSMA	32	FL OZ/A	88 <i>a</i>	80 <i>abcde</i>	87 <i>ab</i>	7.0 <i>abc</i>	8.0 <i>a</i>
11	Outrider MSMA	0.75 32	OZ/A FL OZ/A	77 <i>ab</i>	88 <i>ab</i>	80 <i>ab</i>	5.3 <i>de</i>	7.7 <i>a</i>
12	Outrider Finale Activator 90	0.75 1 0.25	OZ/A PT/A % V/V	55 <i>cdef</i>	83 <i>abc</i>	72 <i>abcd</i>	5.3 <i>de</i>	7.7 <i>a</i>
13	Roundup ProMax	22	FL OZ/A	87 <i>a</i>	88 <i>ab</i>	92 <i>a</i>	1.0 <i>f</i>	3.3 <i>g</i>
14	Clearcast MSO	32 1	FL OZ/A % V/V	43 <i>efgh</i>	78 <i>abcde</i>	82 <i>ab</i>	4.3 <i>e</i>	4.0 <i>fg</i>
15	Plateau MSO	8 1	FL OZ/A % V/V	33 <i>gh</i>	68 <i>ef</i>	52 <i>cde</i>	4.7 <i>de</i>	5.7 <i>de</i>
16	Journey MSO	21.3 1	FL OZ/A % V/V	75 <i>abc</i>	82 <i>abcd</i>	82 <i>ab</i>	2.3 <i>f</i>	3.3 <i>g</i>
17	Pastora Activator 90	1 0.25	OZ/A % V/V	32 <i>h</i>	63 <i>f</i>	33 <i>e</i>	5.0 <i>de</i>	5.0 <i>ef</i>
18	Untreated Check			0 <i>i</i>	0 <i>g</i>	0 <i>f</i>	8.0 <i>a</i>	8.0 <i>a</i>

¹0 = uninjured, 9 = dead plants

²Days after treatment

³Means within a column followed by the same letter are not different according to Fisher's Protected LSD at $P < 0.05$.