

Evaluation of Herbicides for Control of Rough Bluegrass, Cheatgrass, Rattail Fescue and Medusahead in Establishment Year and Second Year Kentucky Bluegrass Grown for Seed

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Abstract

Adequate weed control during the establishment year of Kentucky bluegrass seed production is a challenge, particularly for grassy weeds in a grass crop. This project is a second-year project to evaluate innovative ways to use currently registered products to accomplish this goal, focusing on rough bluegrass, cheatgrass, rattail fescue and medusahead. Treatments and application timings include Callisto pre-emergence between planting and first irrigation, Beacon applied at 0.19 oz/acre, with and without Bronate at 1 pt/acre, at the 2-3 leaf and 4-5 leaf stages, and Beacon at the split application rate of 0.38 oz/acre during a October/November timing. Potential new herbicides, Fierce, Alion and Sharpen were evaluated in a second year stand for control of the same four grassy weeds and for crop safety, compared to two current industry standards. Application timings were pre-emergence and during October/November. Results from establishment year plots indicates significantly less stunting of Kentucky bluegrass when Beacon is applied at 2-3 leaf rather than the 1-2 leaf stage as was done during 2015. Bronate appears to be an effective crop safener when added to Beacon at either 2-3 leaf or 4-5 leaf stages, with similar control of the grassy weeds.

Introduction

The greatest challenge to weed control in Kentucky bluegrass is during the establishment year. Control of grassy weeds while protecting crop safety is vital to crop establishment and is important to first year production and ongoing profitability. This project is designed to evaluate for a second season the most promising of currently available herbicides in various combinations, application timings and rates to identify a successful strategy. Although there are a variety of grassy weeds, the focus of this project is rough bluegrass, cheatgrass, rattail fescue and medusahead. Secondly, it is important to evaluate potential new herbicides that hold promise for use in Kentucky bluegrass to maintain a strong toolbox of herbicides against these four grassy weeds while providing adequate crop safety.

Methods and Materials

Establishment Year:

Kentucky bluegrass (Shamrock) was planted at 7 lbs/acre on August 22, 2016 with the COARC Great Plains drill into ground rotating out of winter wheat. This was done following open field burning, an initial irrigation and reworking the ground. Rough bluegrass, cheatgrass, rattail fescue and medusahead seeds were planted at a high infestation rate (rough bluegrass at 1 g/40 ft, rattail fescue at 1.5 g/40 ft, cheatgrass and medusahead at 3 g/40 ft) with a 5-foot cone planter at 7-inch spacings across 10 x 45 ft plots, replicated 4 times.

Herbicide treatments included Callisto (mesotrione) applied pre-emergence at 6 oz/acre on August 22 between planting and first irrigation on August 23. Beacon (primisulfuron) was applied at 0.19 oz/acre (1/4th label rate) on September 24 at the 2-3 leaf stage and on October 6 at the 5-6 leaf stage. At both application timings Beacon was applied with and without Bronate (bromoxynil +MCPA) at 1 pt/acre as a potential crop safener. In addition, Beacon was applied at a split-application rate of 0.38 oz/acre at a October/November timing on October 24. The labeled rate for Beacon is 0.76 oz/acre, so all treatments left some Beacon in reserve for use later in the fall or spring as needed by managers of production fields. All treatments (Table 1) were applied using a CO₂ powered, backpack sprayer and 20 gal/water per acre. A non-ionic surfactant at 1 qt/100 gal was added to treatments applied at the 2-3 leaf stage, while crop oil concentrate at 1 gal/100 gal was used with all other post-emergence treatments.

Herbicide performance and crop stunting were evaluated October 26 for efficacy of Callisto applied pre-irrigation and Beacon applied at the 2-3 leaf stage. Follow-up evaluations will be conducted as appropriate.

Harvest data will be collected from Kentucky bluegrass plots (Shannon) located at K & S Farms that received similar herbicide treatments to those at COARC. The committee overseeing this research project felt that duplicate plots in a commercial field would provide the most reliable yield data information. First irrigation at these plots was on September 1, with treatments applied at the 2-3 leaf stage on October 10, the 4-5 leaf stage on October 28 and the October/November timing on November 4.

2nd Year Production:

Kentucky bluegrass (Shamrock) plots established at COARC during 2015 are being used for a second year production field to evaluation potential new herbicides for the same four grassy weeds use in the establishment year plots. Plots used during 2016 are staggered from the large 2015 plots to avoid weed species planted in 2015 and treatments that included Beacon applied at 0.15 oz/acre at the 1-2 leaf stage that resulted in significant crop stunting.

Following the initial irrigation, grassy weeds were planted on September 7 following the same procedures used in the establishment year plots. This was followed by pre-emergence application of Fierce at 3 oz/acre, Alion at 1.5 fl oz/acre and Prowl at 1 qt/acre plus Outlook at 21 fl oz/acre. A traditional October/November herbicide application timing was used for post-emergence application of Fierce at 3 oz/acre, Alion at 1.5 fl oz/acre, Sharpen at 2 oz/acre and a combination of Beacon at 0.38 oz/acre plus diuron at 2 lbs/acre plus Goal at 12 fl oz/acre.

Similar to the establishment year plots, harvest data will be collected from Kentucky bluegrass plots (Gaelic) with K & S Farms that received similar herbicide treatments to those at COARC. Pre-emergence treatments at this location were applied September 7 and the October/November

timing was applied on November 4. Follow-up evaluation will be conducted as appropriate.

Results and Discussion

Establishment Year:

No crop stunting was observed October 26 from Callisto applied pre-emergence, with an average of 8 percent crop stunting observed following Beacon applied at 0.15 oz/acre at the 2-3 leaf stage (Table 1). This compares with 35 percent stunting from Beacon applied at 0.19 oz/acre at the 1-2 leaf stage during the 2015 season. Beacon applied alone caused 13 percent stunting of young Kentucky bluegrass, while Beacon plus Bronate caused 5 percent stunting. Sharpen, a new product registered on grass seed, was included in establishment year plots to evaluate crop safety and produced 8 percent stunting.

A different collection of stored cheatgrass seed was inadvertently used for planting across herbicide plots this season, resulting in a lack of germination. Based on the October 26 evaluation of Beacon application at the 2-3 leaf stage, Beacon alone provided 53 percent control of rough bluegrass, an average of 27 percent of rattail fescue and 10 percent control of medusahead. The Beacon plus Bronate combination provided similar results, with an average of 54 percent control of rough bluegrass, 27 percent control of rattail fescue and an average of 18 percent control of medusahead.

Plots at K & S Farms will be harvested and yield data collected during the 2017 harvest season to evaluate crop safety. Results will be shared in a subsequent report.

2nd Year Production:

Germination of weed species in second year plots has been spotty at best. This is perhaps due to greater difficulty for weeds to establish in second year grass fields or a lack of moisture for weed germination despite adequate moisture for field green-up. Although no significant crop injury from pre-emergence applications was observed at the COARC plots, there was strong burn-back of vegetation at the K & S plots that were sprayed over the top with a grower application of Prowl plus Outlook. This had largely disappeared by early November, but was still discernable on closer evaluation as narrower rows with less regrowth. These plots will be harvested for yield data similar to the establishment year plots at the same location.

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Table 1. Herbicide treatments, application rates, timings, crop stunting and percent control of rough bluegrass, rattail fescue and medusahead evaluated October 26 and (December 20), 2016.

Treatment*	Application Rate	Timing	% Crop Injury/Weed Control	
			Oct 26	(Dec 20)
1 Callisto + Beacon + Beacon	6 oz/A	Pre-irrigation	Injury	0
	0.19 oz/A	4-5 leaf	Poa triv	8
	0.38 oz/A	October	Rattail	10
			Medusa	25
2 Beacon + Beacon	0.19 oz/A	2-3 leaf	Injury	13
	0.38 oz/A	October	Poa triv	53
			Rattail	25
			Medusa	10
3 Beacon w/ Bronate + Beacon	0.19 oz/A	2-3 leaf	Injury	5
	1 pt/A	October	Poa triv	45
	0.38 oz/A		Rattail	13
			Medusa	20
4 Beacon Beacon	0.19 oz/A	2-3 leaf	Injury	13
	0.19 oz/A	4-5 leaf	Poa triv	53
			Rattail	28
			Medusa	10
5 Beacon w/ Bronate + Beacon	0.19 oz/A	2-3 leaf	Injury	5
	1 pt/A	4-5 leaf	Poa triv	45
	0.19 oz/A		Rattail	28
			Medusa	10
6 Beacon w/ Bronate + Beacon w/ Bronate	0.19 oz/A	2-3 leaf	Injury	5
	1 pt/A	4-5 leaf	Poa triv	73
	0.19 oz/A		Rattail	40
	1 pt/A		Medusa	23
7 Sharpen	2 oz/A	4-5 leaf	Injury	8
			Poa triv	0
			Rattail	0
			Medusa	0
8 UTC	-----		Injury	0
			Poa triv	0
			Rattail	0
			Medusa	0

* NIS at 1 qt/100 gal was included with treatments applied at the 2-3 leaf stage, while COC at 1 gal/100 gal was used with all other post-emergence treatments.