MEDUSAHEAD CONTROL WITH APPLICATIONS OF PRE- AND POST-EMERGENT HERBICIDES IN KENTUCKY BLUEGRASS GROWN FOR SEED

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Introduction

Because of their morphological and physiological similarities, it is difficult to control annual grasses within a field of perennial grasses. The persistence of annual grass infestations results in a perpetual loss of yield. Medusahead (*Taeniatherum caput-medusae*) is a ubiquitous invader of rangelands and pastures, and recent reports indicate that this annual grassy weed species is present in Kentucky bluegrass (KBG) seed production fields in central Oregon. The presence of medusahead raises concerns among producers because it has the potential to reduce yields and affect seed quality.

The best way to address the medusahead problem is an integral approach that combines practices that promote healthy, vigorous stands of KBG; prevention of weed seed dispersal to production fields; and a weed control program that includes herbicides. The use of pre- and post-emergent herbicides is critical for the success of an integral approach since herbicides can either prevent seedling emergence or provide control of emerged plants growing on infested fields.

Obtaining a label for a new herbicide is costly and requires time. Therefore, testing herbicides already labeled for use in KBG for their effectiveness in medusahead control is a priority. Field studies were conducted at the Central Oregon Research Center (COARC) in Madras, OR, to evaluate pre- and post-emergent herbicides labeled for use in established stands of KBG for their efficacy in medusahead control.

Materials and Methods

Two field studies looking at pre- and post-emergent herbicides for medusahead control were conducted in the fall of 2012 and spring of 2013. The studies were conducted on an established Kentucky bluegrass field at COARC. The study design was a randomized complete block with four replications. Plot size was 10 feet x 30 feet. Medusahead seeds were planted inside a permanent six-square-foot quadrant to ensure weed infestation in all plots.

Pre-emergent herbicides were applied in the fall of 2012. Treatments consisted of dimethenamid (Outlook®), mesotrione (Callisto®), ethofumasate (Nortron®), oxyflourfen (Goal 2 XL®), pendimethalin (Prowl H_20®), terbacil (Sinbar®), and metolachlor (Dual Magnum®). Following herbicide application, the study area was irrigated for soil incorporation of the herbicide. Post-emergent treatments were applied to medusahead plants with two fully expanded true leaves in the spring of 2013. Herbicides used were primisulfuron (Beacon®), metribuzin (Sencor 75DF®), dicamba, flufenacet + metribuzin (Axiom®), flucarbazone (Everest®), and mesotrione (Callisto®). All herbicides were applied with a backpack sprayer calibrated to deliver 20 gallons of spray solution per acre at 40 psi pressure using XR 8002 Teejet® nozzles. Application dates and environmental conditions are detailed in Table 1. Rates and adjuvants for pre-emergent herbicides are detailed in Table 2 and for post-emergent herbicides in Table 3. Herbicide efficacy of pre-emergent herbicides applied in the fall was determined in the spring of 2013. Post-emergent applications were evaluated 30 days after application.

Table 1. Application date and environmental conditions at time of herbicide applications.

	Pre-emergent	Post-emergent
Application date	10/2/12	4/18/13
Time of day	9 am	9 am
Air temperature (°F)	57	47
Relative humidity (%)	54	54
Wind speed (mph)	6	3
Wind direction	SSE	WNW

Results and Discussion

Control with pre-emergent herbicides

Among the tested pre-emergent herbicides, three stood out for their effectiveness in medusahead control. Outlook (21 fl oz/acre), Callisto (6 fl oz/acre), and Nortron (3 qt/acre) provided 90, 88, and 99% percent control, respectively (Table 2). In contrast, no medusahead control was observed with a pre-emergent application of Goal 2XL, Prowl H_20, Sinbar, or Dual Magnum. No visible crop injury was observed after herbicide application.

Control with post-emergent herbicides

Medusahead control provided by all tested post-emergent herbicides was poor, and none provided

commercially acceptable control (Table 3). The most effective herbicide was Sencor 75DF (0.5 lb/a), but it provided only 31% control.

Results from these studies suggest that a few pre-emergent herbicides currently labeled for use in Kentucky bluegrass can prevent medusahead establishment. Once medusahead plants get established, control with post-emergent herbicides is not an alternative with the available labeled herbicides. The limited options for medusahead control with labeled herbicides emphasize the need to implement an integral management program that includes cultural practices that ensure vigorous stands of Kentucky bluegrass grown for seed, efforts to prevent seed dispersal, and other weed management practices. Our studies should be repeated to confirm results and explore other alternatives for medusahead control.

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Table 2. Medusahead percent control with pre-emergent herbicides compared to untreated checks.[1]

No.	Treatment	Rate	Control[2]
			(%)
1	Outlook®	21 fl oz/acre	90 b
2	Callisto®	6 fl oz/acre	88 b
3	Nortron®	3 qt/acre	99 b
4	Goal 2 XL®	3 fl oz/acre	0 a
5	Prowl H_20®	3 qt/acre	0 a
6	Sinbar®	1 lb/acre	0 a
7	Dual Magnum®	21 fl oz/acre	0 a
	Non-treated check	—	0 a
LSD (P = 0.05)			8

[1]Pre-emergent herbicides applied in fall 2012. Efficacy evaluated in spring 2013.
[2]Means among columns followed by the same letter are not different at P = 0.05.

Table 3. Medusahead percent control with post-emergent herbicides compared to untreated checks.[1]

No.	Treatment[2]	Rate	Control[3]
			(%)
1	Beacon®	0.75 oz/a	19 a
	MSO	1% v/v	
	Ammonium sulfate	2% v/v	
2	Sencor 75DF®	0.5 lb/a	31 a
	NIS	0.25% v/v	
	Ammonium sulfate	2% v/v	
3	Dicamba®	2 qt/a	0 b
	NIS	0.25% v/v	
	Ammonium sulfate	2% v/v	
4	Axiom®	10 oz/a	19 a
	NIS	0.25% v/v	
	Ammonium sulfate	2% v/v	
5	Everest 70 WDG®	0.85 oz a	13 ab
	NIS	0.25% v/v	
	Ammonium sulfate	2% v/v	
6	Callisto®	6 fl oz/a	13 ab
	NIS	0.25% v/v	
	Ammonium sulfate	2% v/v	
7	Non-treated check	—	0 b
	LSD (P = 0.05)		18

[1]Efficacy evaluated 30 days after post-emergent herbicide application.
[2]MSO = methylated seed oil; NIS = nonionic surfactant
[3]Means among columns followed by the same letter are not different at P = 0.05.