Herbicide Evaluation for Volunteer Bluegrass Control in Winter Wheat

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Introduction

Under the current rules from the Jefferson County Smoke Management Committee, stands of Kentucky and roughstalk bluegrass are not to be burned after the final seed crop is harvested. This stipulation, along with other factors, is causing a change from burn and till stand removal to no-till and herbicide stand removal. Populations of volunteer bluegrass are much greater in winter wheat planted no-till after bluegrass stand removal than was typical in the burn and till stand removal system. Current herbicide programs for volunteer bluegrass control in winter wheat are inadequate to deal with this situation. The objective of this research was to evaluate control of volunteer Kentucky and roughstalk bluegrass in winter wheat in order to improve the transition to a no-burn stand removal.

Methods and Materials

Two field trials were conducted in commercial fields of winter wheat near Madras, Oregon; one was rotated out of rough bluegrass (*Poa trivialis*) grown for seed and anther was rotated out of Kentucky bluegrass (*Poa pratensis*) grown for seed. The plots in each were 10 ft by 25 ft; both were arranged in randomized complete blocks replicated 4 times. Herbicides were applied with a CO_2-pressurized backpack sprayer delivering 20 gal/acre at 40 psi. In the trial following rough bluegrass, treatments were applied on April 30, 2009 when winter wheat had 2 to 4 tillers. In the trial following Kentucky bluegrass, treatments were applied on April 7, 2009 when winter wheat had 4 to 6 tillers. The planting date of these two stands of winter wheat was not determined. Weed control and crop injury were evaluated visually with a 0 to 100 percent rating scale.

Results and Discussion

In the trial following rough bluegrass, rattail fescue (*Vulpia myuros*) was also present. In that trial, pinoxaden, mesosulfuron, and mesosulfuron + propoxycarbazone all controlled the roughstalk bluegrass very well (Table 1). Pinoxaden did not control rattail fescue and fenoxaprop did not control either roughstalk bluegrass or rattail fescue. The population of grassy weeds was low in this trial; therefore herbicide efficacy may be lower in fields with higher weed densities.

When these treatments were applied on April 30 the wheat was already stressed, perhaps from a previous application of Harmony® Extra (thifensulfuron + tribenuron). By May 9, the wheat in the checks and the rest of the field had recovered from that stress. However, the wheat that was treated with mesosulfuron and mesosulfuron + propoxycarbazone was still not recovering. By June 1, these injury symptoms were much less visible, but the wheat was clearly not going reach the vigor of wheat in the check. Thifensulfuron, tribenuron, mesosulfuron, and propoxycarbazone all have the same mode of action, ALS inhibition. The stress that was observed likely persisted in these plots because the wheat was possibly overloaded on ALS-inhibiting herbicides in a short period of time. Pinoxaden and fenoxaprop have different modes of action, and therefore did not exhibit the injury.

In the trial following Kentucky bluegrass, pinoxaden did the best job of controlling the volunteer Kentucky bluegrass (Table 2). Mesosulfuron eventually achieved similar control as pinoxaden, but took longer. Mesosulfuron + propoxycarbazone moderately controlled Kentucky bluegrass and fenoxaprop only suppressed the Kentucky bluegrass. None of the wheat was injured. Also, there was a lot of volunteer Kentucky bluegrass in the field, which made the evaluations of control straightforward. There were a few broadleaf weeds present in this trial, but the only one with adequate populations to evaluate was flixweed (*Descurainia sophia*). Mesosulfuron and mesosulfuron + propoxycarbazone both controlled flixweed.

The best stand-alone herbicide for control of volunteer bluegrasses was mesosulfuron. However, pinoxaden may be appropriate in situations where other ALS-inhibiting herbicides will be applied. Whichever herbicide is selected for controlling volunteer bluegrass, the application needs to be done when the wheat canopy is still open enough to allow adequate coverage of the grasses below.

As a follow-up point to this research, both fields in which these trials were conducted were rotated into carrots and no carryover herbicide injury was observed.

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Table 1. Injury to winter wheat and control of volunteer rough bluegrass and rattail fescue with herbicides near Madras, Oregon, 2009.

			Winter wheat		Rough bluegrass		Rattail fescue
Treatment[1]	Product	Rate	May 9	June 1	May 9	June 1	June 1
		(lb ai/A)	----- % injury -----		------------- % control -------------		
Mesosulfuron[2]	Osprey 4.5 WDG	0.0134	25	9	30	98	93
Mesosulfuron + Propoxycarbazone[2]	Olympus Flex 11.25 WDG	0.0246	25	9	33	100	97
Pinoxaden	Axial XL 0.42 EC	0.054	4	1	5	98	44
Fenoxaprop	Puma 1 EC	0.083	1	0	3	70	45

[1]Applied April 30, 2009 when winter wheat had 2 to 4 tillers.
[2]Applied with non-ionic surfactant at 0.25% v/v and urea ammonium nitrate (Solution 32) at 1 gal/acre.

Table 2. Control of volunteer Kentucky bluegrass and flixweed with herbicides in winter wheat near Madras, Oregon, 2009.[1]

Treatment[2]	Product	Rate	Kentucky bluegrass			Flixweed		
			April 20	May 9	June 1	April 20	May 9	June 1
		(lb ai/A)	------------------------------------ % control ----------------------------------					
Mesosulfuron[3]	Osprey 4.5 WDG	0.0134	23	80	93	57	79	100
Mesosulfuron + Propoxycarbazone[3]	Olympus Flex 11.25 WDG	0.0246	37	70	85	60	84	100
Pinoxaden	Axial XL 0.42 EC	0.054	23	90	98	3	3	17
Fenoxaprop	Puma 1 EC	0.083	27	67	67	1	0	0

[1]No winter wheat injury was observed, therefore data are not shown.
[2]Applied April 7, 2009 when winter wheat had 4 to 6 tillers.
[3]Applied with non-ionic surfactant at 0.25% v/v and urea ammonium nitrate (Solution 32) at 1 gal/acre.