

Weed Control with Fierce and RyzUp Smartgrass (GA₃) in Fallow

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The study objective was to evaluate Fierce® (pyroxasulfone with flumioxazin) and Outrider® (sulfosulfuron) with and without RyzUp Smartgrass® (GA₃) for weed control in fallow. The target weed was downy brome (*Bromus tectorum* L.). Tumble mustard (*Sisymbrium altissimum* L.), jointed goatgrass (*Aegilops cylindrica* Host), and field horsetweed [*Erigeron canadensis* (L.) Cronq.] were also present in the trial and evaluated in response to treatments.

The study was established at the WSU Wilke Farm near Davenport, WA. Treatments of Fierce (application A) were applied in fall of 2018 and Outrider treatments (application B) were applied early spring of 2019, detailed in Table 2 and Table 3. Treatments were applied with a CO₂ powered backpack sprayer and a 5 ft boom with 4 Teejet 11002VS nozzles, calibrated to deliver 15 gallons per acre (GPA). The entire study site was treated with glyphosate (RT3) at 28 fl oz A⁻¹ with NIS (0.25% v/v) and AMS (8lb/100gal) 7 days prior to fall applications being applied. The study was conducted in a randomized complete block design with 4 replications. Plots were 10 ft by 30ft long.

Table 1. Soil characteristics for field site for study ICB0519

Soil Texture	pH	OM	CEC	Sand	Silt	Clay	NO ₃ -N	NH ₄ -N	Sulfur	P (bic)	K (bic)
		%		%	%	%	lb A ⁻¹	lb A ⁻¹	ppm	ppm	ppm
Silt Loam	5.5	2.54	16.5	27.5	65.0	7.5	42	20	3	2.8	344

Pest control and chlorosis, or injury, of present pests was visually rated 28 weeks after treatment of application A [WATA (1 WATB)]. Downy brome and tumble mustard control was visually assessed 30 WATA (3 WATB) and again at 33 WATA (6 WATB). Weed density was assessed in the field and weed biomass was collected 37 WATA (11 WATB) and then dried in a laboratory oven at 60°C for 3 days. Study was terminated after weed biomass was collection. All data was subjected to an analysis of variance using the statistical package built into the Agricultural Research Manager software system (ARM 8.5.0, Gylling Data Management).

Table 2. Treatment application details

Study Application	A	B
Date	October 5, 2018	April 9, 2019
Application volume (GPA)	15	15
Weed Stage	None	1-leaf downy brome rosette tumble mustard
Air temperature (°F)	54	45
Soil temperature (°F)	52	43
Wind velocity (mph, direction)	6.5, S	7, W
Cloud Cover	90	100
Next rain occurred on	October 6, 2018	April 12, 2019
Rain accumulation 2 WAT (IN)	0.36	0.31

Results



Figure 1. *Ryzup Smartgrass alone (A), Ryzup Smartgrass with Fierce (B), Fierce alone (C), RyzUp Smartgrass with Outrider (D), and Outrider applied alone (E) 30 weeks after treatment of application A [WATA (3 WATB)].*

Fierce and Outrider were applied with and without RyzUp Smartgrass. No differences in control were observed with the addition of RyzUp Smartgrass to the herbicide treatment.

Control with Fierce was 96% 28 WATA while all other treatments had 0% weed control (1 WATB). However, chlorosis of the weeds was present where Outrider had been applied 1 WATB (28 WATA).

Two weeks later, Fierce treatments were still controlling both downy brome and tumble mustard with greater than 93% control (30 WATA; 3 WATB). Outrider had 50% (alone) and 63% (with RyzUp Smartgrass) downy brome control and 0% control of the tumble mustard at 3 WATA (30 WATA).

By 6 WATB, control of downy brome with Outrider was 0% control while Fierce applied in the fall controlled downy brome 95% 33 WATA. However, broadleaf (tumble mustard, prickly lettuce, common lambsquarters) control had declined for all treatments with less than 35% control 33 WATA (6 WATB).

Weed density was assessed 37 weeks after the Fierce was applied (WATA), or 11 weeks after the Outrider application (WATB). Downy brome density was lower in Fierce treatments at 1 plant m⁻² compared

to 350 plants m⁻² for the nontreated and 110 plants m⁻² for Outrider. Similar results were observed for broadleaf weed density, grass weed density, and total weed density.

Total weed biomass was similar for all treatments (average 267 g m⁻²), although reduced when Fierce was applied (average 139 g m⁻²) (Table 4).

Table 3. Percent pest control, chlorosis of pests, and control of downy brome and broadleaf weeds. Davenport, WA, 2019. Means followed by the same letter are not statistically significantly different ($\alpha=0.05$).

Treatment	Rate		April 16, 2019 (28 WATA; 1 WATB)		May 1, 2019 (30 WATA; 3 WATB)		May 23, 2019 (33 WATA; 6 WATB)	
			Pest Control	Chlorosis of Pest	Downy Brome Control	Tumble Mustard Control	Downy Brome Control	Broadleaf Control
			%	%	%	%	%	%
Nontreated	-	-	-	-	-	-	-	-
RyzUp Smartgrass	0.5 oz/A	0.0125	0 b	0 b	0 c	0 b	0 b	0
RyzUp Smartgrass	0.5 oz/A	0.0125						
Fierce	3 oz/A	0.1430	98 a	0 b	94 a	97 a	95 a	23
Fierce	3 oz/A	0.1430	96 a	0 b	93 a	97 a	95 a	35
RyzUp Smartgrass	0.5 oz/A	0.0125						
Outrider	0.66 oz/A	0.0310	0 b	23 a	63 b	0 b	0 b	0
AMS	2.5 lb/A							
NIS	0.25% v/v							
Outrider	0.66 oz/A	0.0310	0 b	23 a	50 b	0 b	0 b	0
AMS	2.5 lb/A							
NIS	0.25% v/v							
LSD			7.10	5.15	18.48	6.63	0.00	NS

Table 4. Weed density for downy brome, broadleaves, grasses, and all weeds and total weed biomass. Davenport, WA, 2019. Means followed by the same letter are not statistically significantly different ($\alpha=0.05$).

Treatment	Rate		June 24, 2019 (37 WATA; 11 WATB)				
			Downy Brome Density	Broadleaves Density	Grass Total Density	Total Weed Density	Total Weed Biomass
			# m ⁻²	# m ⁻²	# m ⁻²	# m ⁻²	dry g m ⁻²
Nontreated	-	-	350 a	320 a	360 a	680 a	353
RyzUp Smartgrass	0.5 oz/A	0.0125	260 a	290 a	310 a	600 a	276
RyzUp Smartgrass	0.5 oz/A	0.0125					
Fierce	3 oz/A	0.1430	1 b	30 b	30 b	60 b	148
Fierce	3 oz/A	0.1430	1 b	20 b	30 b	60 b	129
RyzUp Smartgrass	0.5 oz/A	0.0125					
Outrider	0.66 oz/A	0.0310	60 ab	450 a	70 ab	510 a	328
AMS	2.5 lb/A						
NIS	0.25% v/v						
Outrider	0.66 oz/A	0.0310	110 ab	430 a	130 ab	560 a	367
AMS	2.5 lb/A						
NIS	0.25% v/v						
LSD			0.59t	17.57	0.52t	21.36	NS