

COMPARISON OF GOAL 2XL[®] AND GOALTENDER[®] FOR CROP INJURY AND WEED CONTROL IN ONION

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Introduction

Goaltender[®] is a new formulation of oxyfluorfen, the same active ingredient in Goal 2XL[®]. Goaltender is currently registered for use in onions. Goaltender is a water-based formulation and does not use solvents as a carrier for the herbicide as does Goal 2XL. Because solvents can remove leaf wax from plant leaves, it is possible that by using a water-based formulation of oxyfluorfen, onion injury can be reduced, or oxyfluorfen can be applied to smaller onions. The research reported here evaluated Goal 2XL and Goaltender applied at two onion growth stages for onion tolerance and weed control efficacy.

Materials and Methods

A trial was conducted at the Malheur Experiment Station under furrow irrigation. On March 31, onions (cv. 'Vaquero', Nunhems, Parma, ID) were planted at 3.7-inch spacing in double rows on 22-inch beds. Plots were 4 rows wide and 27 ft long and arranged in a randomized complete block design with 4 replicates. Lorsban[®] was applied in a 6-inch band over each double row at 3.7 oz/1,000 ft of row. Onions were sidedressed with 150 lb nitrogen, 50 lb phosphorus, 30 lb potassium, 30 lb sulfate, 8 lb zinc, 5 lb manganese, 1 lb copper, and 2 lb boron/acre on June 7. Registered insecticides and fungicides were applied for thrips and downy mildew control.

All plots were treated with Roundup[®] (glyphosate) at 0.75 lb ae/acre preemergence on April 12. Goal 2XL or Goaltender were applied at different rates to one- or two-leaf onions. Herbicide treatments were applied with a CO₂-pressurized backpack sprayer. Preemergence Roundup was applied at 20 gal/acre at 30 psi. Postemergence treatments were applied at 40 gal/acre at 30 psi. Applications were made to one-leaf onions on May 7 and to two-leaf onions on May 21. All plots received Poast[®] (sethoxydim) at 0.29 lbs ai/acre plus crop oil concentrate (COC) (1 qt/acre) on May 24 to control grasses. Weed control and onion injury were evaluated through June. Because single postemergence herbicide applications did not effectively control weeds, the trial was concluded on June 13 and onion yields were not taken.

Data were analyzed using analysis of variance and means were separated using a protected least significant difference (LSD) at the 5 percent level (0.05).

Results and Discussion

Onion injury was not different for Goal 2XL or Goaltender on May 10 or May 17 (Table 1). Injury on May 17 was severe, ranging from 35 to 41 percent. On May 24, injury with Goaltender applied to one-leaf onions was less with 0.125 lb ai/acre compared to 0.188 lb ai/acre. Goal 2XL applied to one-leaf onions caused injury similar to both rates of Goaltender. At the same application rates, Goal 2XL caused greater injury than Goaltender when applied to two-leaf onions. On May 28, onion injury among treatments was not different, and on June 13 all treatments applied to two-leaf onions exhibited greater injury than treatments applied to one-leaf onions. Onion injury is inversely related to the time that has elapsed since the last postemergence herbicide application.

Herbicide applications to one-leaf onions provided significantly greater control of pigweed, common lambsquarters, and hairy nightshade compared to herbicide application to two-leaf onions (Table 2). This is because the weeds were very small when the one-leaf applications were made and grew significantly larger by the time the two-leaf applications were made. Goal 2XL and Goaltender applied to one-leaf onions provided similar control of pigweed and hairy nightshade. However, on May 24 and June 13 Goal 2XL provided greater control of common lambsquarters. For application to two-leaf onions, increasing the rate of either Goal 2XL or Goaltender increased the control of all weed species. In all cases, when applied at the same rate, Goal 2XL provided greater control of pigweed, common lambsquarters, and hairy nightshade compared to Goaltender. Effective weed control was not possible with a single postemergence herbicide application. Conducting a similar trial with additional sequential postemergence treatments may produce a different outcome.

While there was a trend for less onion injury by using Goaltender, there were also reductions in the level of weed control. There was little advantage to using Goaltender early to reduce onion injury in this trial. However, under different environmental conditions, a non-solvent-based herbicide may provide additional crop safety. Further testing is needed to determine how Goaltender may fit into a weed management program in bulb onions.

Table 1. Onion injury in response to rates and timings of applications of Goal 2XL[®], and Goaltender[®], Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.

Treatment*	Rate lb ai/acre	Timing [†] Leaf	Onion injury				
			5-10	5-17	5-24	5-28	6-13
Untreated	--	--	--	--	--	--	--
Goaltender	0.125	1-leaf	11	35	16	11	0
Goaltender	0.188	1-leaf	9	39	21	14	1
Goal 2XL	0.125	1-leaf	14	41	19	14	3
Goaltender	0.125	2-leaf	-	-	6	11	9
Goaltender	0.25	2-leaf	-	-	12	11	9
Goal 2XL	0.125	2-leaf	-	-	14	14	11
Goal 2XL	0.25	2-leaf	-	-	21	17	11
LSD (0.05)	--	--	NS	NS	4.7	NS	4

*All plots were treated with Roundup (0.75 lb ae/acre) preemergence on April 12.

[†]Treatments were applied to one-leaf (1-leaf) onions on May 7 and to two-leaf (2-leaf) onions on May 21.

Table 2. Weed control in onion in response to rates and timings of applications of Goal 2XL[®], and Goaltender[®], Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.

Treatment*	Rate lb ai/acre	Timing [†] Leaf	Weed control					
			Pigweed [‡]		Common lambsquarters		Hairy nightshade	
			5-24	6-13	5-24	6-13	5-24	6-13
Untreated	--	--	--	--	--	--	--	--
Goaltender	0.125	1-leaf	95	98	84	66	95	97
Goaltender	0.188	1-leaf	97	98	90	78	97	100
Goal 2XL	0.125	1-leaf	98	100	97	96	98	98
Goaltender	0.125	2-leaf	31	38	21	25	21	20
Goaltender	0.25	2-leaf	50	43	25	37	36	30
Goal 2XL	0.125	2-leaf	53	58	43	63	42	37
Goal 2XL	0.25	2-leaf	68	70	58	64	56	47
LSD (0.05)	--	--	11	9	5	12	9	12

*All plots were treated with Roundup (0.75 lb ae/acre) preemergence on April 12.

[†]Treatments were applied to one-leaf (1-leaf) onions on May 7 and to two-leaf (2-leaf) onions on May 21.

[‡]Pigweed is a combination of redroot pigweed and Powell amaranth.