

WEED MANAGEMENT STRATEGIES IN IMIDAZOLINONE-RESISTANT SUNFLOWER

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INTRODUCTION

Imazamox is labeled at 0.031 lb ai/acre with NIS + UAN for control of < 3-inch tall broadleaf weeds and < 4- to 5-leaf grass weeds on 2- to 8-leaf imidazolinone-resistant (Clearfield™) sunflower. This trial was conducted to evaluate strategies for optimizing weed control with imazamox and selected PRE herbicides in imidazolinone-resistant sunflower.

MATERIALS & METHODS

The experiment was conducted on a loam soil with 8.0 pH and 3.3% organic matter at the NDSU Carrington Research Extension Center. The trial had a randomized complete block design with three replicates. The trial area was tilled with a disk followed by two passes with a Melroe culti-harrow on October 20, 2003. Fall sulfentrazone treatments were applied October 28 with significant snowfall occurring the following day. Oilseed hybrid 'Viper' was planted in 30-inch rows without any prior spring tillage on May 28, 2004 and hand-thinned to 20,000 plants/A on June 25. Growing-season herbicide treatments were applied at 10 gal/A and 30 psi through 8001 flat fan nozzles. PRE treatments were applied on a dry soil surface on May 28. Glyphosate at 0.75 lb ae/A was applied across the trial on May 28. Rainfall totaled 2.27 inches during May 29 to 30. POST treatments were applied on July 3 to V6- to V8-stage sunflower, tillering green and yellow foxtail, and 2- to 12-inch tall common lambsquarters, 1- to 3-inch tall hairy and eastern black nightshade, 1- to 3-inch tall prostrate and redroot pigweed, and 1- to 10-inch tall annual smartweed. Late POST treatments were applied on July 9 to V8-stage sunflower, 6-inch tall green and yellow foxtail, and 6- to 12-inch tall common lambsquarters, 2- to 4-inch tall hairy and eastern black nightshade, 2- to 8-inch tall prostrate and redroot pigweed, and 6- to 12-inch tall annual smartweed. Weed densities on July 8 were: foxtail = 46 plants/ft², common lambsquarters = 1 plant/ft², nightshade = 4 plants/ft², and annual smartweed = 14 plants/ft². The trial was harvested on November 3.

RESULTS & DISCUSSION

With the exception of common lambsquarters, broadleaf weed control was poor (0-50%) with fall- or spring-applied sulfentrazone and yield was reduced (34-45%) compared to treatments that included imazamox (Table). POST imazamox following sulfentrazone, pendimethalin, or the combination provided 85 to 99% control of all weeds, except annual smartweed (74-83%). Weed control tended to improve with the POST vs. LPOST application timing. Imazamox + MSO improved control of foxtail and smartweed compared to NIS with the POST but not the LPOST application timing. Height reduction generally occurred with treatments that included imazamox, but the generally adequate weed control contributed to highest yields (1200-1450 lb/acre) in the trial.

Table. Weed control and performance of imidazolinone-resistant sunflower, Carrington, ND, 2004.

Treatment	Herbicide ¹	Rate ai/A	Timing	Weed control ²					Sunflower stunting ³		Seed yield lb/A
				fota	colq	nish	piwe	smwe	2 WAA	4 WAA	
untreated check		x	x	0	0	0	0	0	0	0	481
Sulfentrazone/Sethoxydim+MSO		0.188/0.2	Fall/POST	88	81	37	13	0	3	0	961
Sulfentrazone/Sethoxydim+MSO		0.25/0.2	Fall/POST	89	86	50	13	0	0	0	850
Sulfentrazone/Sethoxydim+MSO		0.188/0.2	PRE/POST	88	48	35	13	0	0	0	796
Sulfentrazone/Imazamox+NIS		0.094/0.031	PRE/POST	92	85	98	99	80	19	6	1324
Imazamox+NIS		0.031	POST	96	86	99	99	74	18	9	1403
Pendimethalin/Imazamox+NIS		1.3/0.031	PRE/POST	98	97	99	99	79	18	14	1328
Imazamox+MSO		0.031	POST	97	88	99	99	83	19	11	1381
Pendimethalin/Imazamox+MSO		1.3/0.031	PRE/POST	88	74	91	99	72	14	16	1451
Pendimethalin+sulfentrazone/Imazamox+MSO		1.3+0.094/0.031	PRE/POST	97	83	99	99	83	16	12	1193
Imazamox+NIS		0.031	LPOST	72	68	76	92	72	15	3	1315
Pendimethalin/Imazamox+NIS		1.3/0.031	PRE/LPOST	77	72	93	95	69	0	0	1398
Imazamox+MSO		0.031	LPOST	76	76	86	92	73	17	10	1304
Pendimethalin/Imazamox+MSO		1.3/0.031	PRE/LPOST	82	80	95	99	70	0	0	1297
LSD (0.05)				4	14	22	17	10	8	10	336

¹Treatments: MSO=Destiny, a methylated seed oil from Agrilience, St. Paul, MN, at 32 fl oz/A with sethoxydim and 1% v/v with imazamox; NIS=Preference, a nonionic surfactant from Agrilience, at 0.25% v/v. All imazamox treatments include UAN at 2.5% v/v. Timing: Fall=October 28, 2003; PRE=May 28, 2004; POST=July 3; LPOST=July 9.

²Visual evaluation 4 weeks after herbicide application; fota=green and yellow foxtail; colq=common lambsquarters; nish=hairy and Eastern black nightshade; piwe=prostrate and redroot pigweed; smwe=annual smartweed.

³WAA=week after POST or LPOST application.



PRE sulfentrazone at 0.094 lb/A followed by POST imazamox + NIS + UAN



POST imazamox + NIS + UAN



PRE Prowl at 1.3 lb/A followed by LPOST imazamox + NIS + UAN

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