

Crop response and weed control in imidazolinone-resistant sunflower, Carrington, 2003
(Endres and Howatt)

Crop response and weed control were investigated with selected PRE and POST herbicides in imidazolinone-resistant (Clearfield™) sunflower. PRE imidazolinone and sulfonylurea herbicides were selected to simulate impact of soil residue on the sunflower. The trial had a randomized complete block design with four replicates. The experiment was conducted on a loam soil with 6.8 pH and 3.1% organic matter at the NDSU Carrington Research Extension Center. The trial area was tilled with a Melroe culti-harrow on May 21. Herbicide treatments were applied to 10 by 30 ft plots with a CO₂ pressurized hand-held plot sprayer at 17 gal/A and 35 psi through 8002 flat fan nozzles. PPI treatments were applied on a dry soil surface on May 22 with 72 F, 20% RH, 65% clear sky, and 5 mph wind, and immediately incorporated twice with the culti-harrow at a 2- to 3-inch depth. Mycogen '8N429CL' was planted on May 22 in 30-inch rows. PRE treatments were applied on a dry soil surface on May 22 with 71 F, 20% RH, 85% clear sky, and 6 mph wind. Rainfall totaled 1.10 inches during May 22 to June 9. POST treatments were applied on June 27 with 55 F, 96% RH, 50% clear sky, and 5 mph wind to V8-stage sunflower, 1-leaf to 2-tiller green and yellow foxtail, jointing wild oat, and 1- to 4-inch tall broadleaf weeds. Clethodim at 0.13 lb/A + MSO at 2 pt/A was applied on July 1 to plots with PRE treatments and untreated checks. The trial was harvested with a plot combine on October 21.

Sunflower stand and seed yield did not differ among treatments (Table 1). Sunflower plant chlorosis (data not shown) and early height reduction was not detected with PRE treatments. Minor plant stunting was noted with PPI and POST treatments and later in the season with PRE treatments. Lack of crop response with PRE treatments may have been due to delayed rainfall after herbicide application. High rates of imazethapyr and metsulfuron provided excellent control of pigweed. Wild buckwheat control ranged from 79 to 89% control with PPI pendamethalin+imazethapyr at 0.52+0.031 lb/A (Table 2). Ethafluralin/imazamox provided excellent weed control. PRE pendimethalin/imazamox provided good to excellent broadleaf control.

Table 1. Imidazolinone-resistant sunflower response to herbicides.

Treatment ²	Herbicide		Stand		Plant stunting ¹			Seed yield lb/A
	Rate ai/A	Timing	6/13 plants/A	7/25 plants/A	2 %	4 %	8 %	
Imazethapyr	0.5 oz	PRE	22325	18332	0	0	3	1901
Imazethapyr	0.25 oz	PRE	25229	23595	0	0	0	1537
Imazethapyr	0.125 oz	PRE	18332	18332	0	0	0	1702
Metsulfuron	0.06 oz	PRE	18695	17243	0	0	12	1281
Metsulfuron	0.03 oz	PRE	21599	21780	0	0	0	1516
Metsulfuron	0.015 oz	PRE	18876	18150	0	0	1	1634
Flucarbazone	0.42 oz	PRE	20510	20691	0	0	6	1495
Flucarbazone	0.21 oz	PRE	23232	22143	0	0	0	1686
Flucarbazone	0.105 oz	PRE	22506	21417	0	0	0	1557
Sulfentrazone	3 oz	PRE	18332	17969	0	0	8	1596
Pendimethalin/Imazamox+NIS+UAN	0.98 lb/0.031 lb	PRE/ POST	18876	19239	15	5	x	1562
Ethafluralin/Imazamox+NIS+UAN	1.1 lb/0.031 lb	PPI/ POST	21962	21417	10	0	x	1563
Pendamethalin+Imazethapyr	0.52 lb+0.031 lb	PPI	23777	23414	3	0	x	1254
Imazamox+NIS+UAN	0.031 lb	POST	23232	23051	15	5	x	1074
untreated check	x	x	17061	16335	0	0	0	1239
LSD (0.05)			NS	NS	8	NS	NS	NS

¹PRE=wk after sunflower emergence; POST=wk after application.

²NIS=Preference, a nonionic surfactant from Agrilience, St. Paul, MN, at 0.25% v/v; UAN at 2.5% v/v.

Table 2. Weed control in imidazolinone-resistant sunflower.

Treatment ¹	Herbicide		July 14, 2003				July 25, 2003				
	Rate lb/A	Timing	grass ²	piwe ³	wibw	smwe	fota ⁴	wioa	piwe	wibw	smwe
Pendimethalin/ Imazamox+NIS+UAN	0.98/0.031	PRE/ POST	78	99	95	99	76	97	98	83	92
Ethafluralin/ Imazamox+NIS+UAN	1.1/0.031	PPI/ POST	96	99	99	91	95	98	99	99	97
Pendamethalin+ Imazethapyr	0.52+0.031	PPI	77	99	89	75	76	78	99	79	88
Imazamox+NIS+UAN	0.031	POST	72	82	65	82	74	90	90	69	92
LSD (0.05)			7	3	13	NS	6	12	7	13	NS

¹NIS=Preference, a nonionic surfactant from Agrilience, St. Paul, MN, at 0.25% v/v; UAN at 2.5% v/v.

²grass=green and yellow foxtail, and wioa.

³piwe=prostrate and redroot pigweed.

⁴fota=green and yellow foxtail.