

# WEED CONTROL AND CROP RESPONSE WITH OPTION<sup>®</sup> AND IMPACT<sup>®</sup> HERBICIDES IN FURROW-IRRIGATED FIELD CORN

Corey V. Ransom and Joey K. Ishida  
Malheur Experiment Station  
Oregon State University  
Ontario, OR

## Introduction

Weed control is important in field corn production to reduce competition with the crop and to prevent the production of weed seed for future crops. Field trials were conducted to evaluate Option<sup>®</sup> (foramsulfuron) herbicide applied with various adjuvants and to evaluate Impact<sup>®</sup> (topramezone) in various combinations with other herbicides for weed control and crop tolerance in furrow-irrigated field corn. Option is a new postemergence sulfonylurea herbicide that controls annual and perennial grass and broadleaf weeds in field corn. Option contains a safener that is intended to enhance the ability of corn to recover from any yellowing or stunting sometimes associated with the application of sulfonylurea herbicides. Impact is also a new herbicide registered for use in corn that provides control of many broadleaf and grass weed species. Impact is a pigment synthesis inhibitor and causes bleaching of treated weeds.

## Materials and Methods

Two trials were established to evaluate Option and Impact for weed control efficacy and crop safety in furrow-irrigated field corn. Croplan 441 field corn was planted with a John Deere model 71 Flexi Planter on May 24. Seed spacing was one seed every 7 inches. Plots were sidedressed with 158 lb nitrogen (N), 85 lb phosphorous, 6 lb sulfates, 6 lb zinc, 1 lb boron, 5 lb manganese, and 100 lb elemental sulfur/acre on April 26. Plots were 7.33 by 30 ft and herbicide treatments were arranged in a randomized complete block with four replicates. Herbicide treatments were applied with a CO<sub>2</sub>-pressurized backpack sprayer. The sprayer was calibrated to deliver 10 gal/acre at 30 psi for the Option trial and 20 gal/acre at 30 psi for the Impact trial. Crop response and weed control were evaluated throughout the growing season. Corn yields were determined by harvesting ears from 26-ft sections of the center 2 rows in each 4-row plot on November 11. The harvested ears were shelled and grain weight and percent moisture content were recorded. Grain yields were adjusted to 12 percent moisture content. Data were analyzed using analysis of variance (ANOVA) and treatment means were separated using Fisher's protected least significant difference (LSD) at the 5 percent level ( $P = 0.05$ ).

Option was evaluated with various surfactant systems and in two combinations including Distinct<sup>®</sup>. Impact was applied in combination with Aatrex<sup>®</sup>, crop oil concentrate (COC) and 32 percent urea ammonium nitrate (UAN) following

preemergence applications of Dual II Magnum<sup>®</sup> or Outlook<sup>®</sup>. Impact treatments were compared to Callisto<sup>®</sup>, Option, and Clarity<sup>®</sup> treatments applied postemergence following preemergence applications of Dual II Magnum.

## Results and Discussion

### ***Option Combinations***

Option applied without a surfactant provided less control of pigweed species (Powell amaranth and redroot pigweed) and barnyardgrass than the other treatments (Table 1). Common lambsquarters was the most difficult weed to control with Option, and Option without surfactant provided the least control. Option with COC for surfactant also had less common lambsquarters control than all other treatments containing surfactant. The addition of Distinct at either 0.088 or 0.131 lb ai/acre to Option provided complete control of common lambsquarters. All treatments effectively controlled hairy nightshade, although nightshade populations were low. Kochia control was less when Option was applied without a surfactant, but was similar among treatments containing surfactant. Option must be applied with a surfactant to optimize weed control. The surfactant selected can affect control of difficult weeds such as common lambsquarters. Corn injury was affected by surfactant, with no surfactant or COC causing less injury than all treatments. Corn height was also reduced by all Option treatments except for those with COC or no surfactant. Corn yields were not different among treatments including the untreated control (Table 2).

### ***Impact Combinations***

Dual II Magnum alone preemergence provided less control of pigweed species, common lambsquarters, hairy nightshade, and kochia than treatments containing a preemergence herbicide followed by postemergence treatments (Table 3). Weed control was greater than 95 percent with preemergence and postemergence combinations and there were no differences among these treatments. Option postemergence caused significantly greater injury than all other treatments on June 28 (Table 4). Clarity also caused slightly higher injury than the other treatments. On July 5, injury was similar among preemergence and postemergence combinations. Corn height was reduced on June 28 by the Option treatment compared to all other treatments. Clarity reduced corn height compared to the untreated control, but height was similar to all other treatments except Option. On July 5 there were no differences in corn height among treatments. Corn yields were not different among treatments including the untreated control.

Table 1. Weed control with Option<sup>®</sup> herbicide applied with different surfactants and with Distinct<sup>®</sup> in field corn, Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.

Treatment	Rate* lb ai/acre pt/acre % v/v	Timing <sup>†</sup>	Weed control <sup>‡</sup>				
			Pigweed spp <sup>§</sup>	C. lambs- quarters	H. night- shade	Kochia	Barnyard- grass
Untreated	--	--	-	-	-	-	-
Option + MSO + 32% N	0.066 + 1.0 + 3.0	MP	99 a	96 ab	100	100 a	100 a
Option + MSO + 32% N	0.066 + 1.5 + 3.0	MP	99 a	99 ab	100	100 a	100 a
Option + COC + 32% N	0.066 + 1.0% + 3.0	MP	100 a	84 c	100	99 a	96 ab
Option + MSO + AMS	0.066 + 1.5 + 3.0 lb	MP	99 a	97 ab	100	100 a	98 a
Option + 32% N	0.066 + 3.0	MP	96 b	72 d	100	86 b	89 b
Option + Distinct + MSO + UAN 32%	0.066 + 0.088 + 1.5 + 3.0	MP	100 a	100 a	100	100 a	99 a
Option + Distinct + MSO + UAN 32%	0.066 + 0.131 + 1.5 + 3.0	MP	100 a	100 a	100	100 a	100 a

\*Herbicide rates are in lb ai/acre. Additive rates are in pt/acre, percent v/v, or lb/acre.

<sup>†</sup>Treatments were applied mid-postemergence (MP) to corn at the V4 growth stage on June 20.

<sup>‡</sup>Weed control was evaluated July 18. The untreated control was not included in the ANOVA for weed control. ANOVA was performed on arcsine square-root transformed data. Non-transformed means are shown. Means followed by the same letter are not significantly different from each other at the P = 0.05 confidence level.

<sup>§</sup>Pigweed species were a mixture of Powell amaranth and redroot pigweed.

Table 2. Injury, height, and yield with Option<sup>®</sup> herbicide applied with different additives in field corn, Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.

Treatment	Rate* lb ai/acre pt/acre % v/v	Timing <sup>†</sup>	Field corn				Yield <sup>§</sup> bu/acre
			Injury <sup>‡</sup>		Height		
			6-28	7-5	6-28	7-5	
		----- % -----		----- in -----			
Untreated	--	--	--	--	18.5	30.9	253
Option + MSO + 32% N	0.066 + 1.0 + 3.0	MP	29	14	15.2	30.8	253
Option + MSO + 32% N	0.066 + 1.5 + 3.0	MP	32	17	16.0	31.3	259
Option + COC + 32% N	0.066 + 1.0% + 3.0	MP	3	0	19.9	32.9	262
Option + MSO + AMS	0.066 + 1.5 + 3.0 lb	MP	27	9	15.5	30.9	257
Option + 32% N	0.066 + 3.0	MP	4	3	19.7	31.6	268
Option + Distinct + MSO + UAN 32%	0.066 + 0.088 + 1.5 + 3.0	MP	31	15	16.1	31.7	265
Option + Distinct + MSO + UAN 32%	0.066 + 0.131 + 1.5 + 3.0	MP	36	14	15.8	30.8	267
LSD (0.05)			10	9	1.4	NS	NS

\*Herbicide rates are in lb ai/acre. Additive rates are in pt/acre, percent v/v, or lb/acre.

<sup>†</sup>Treatments were applied mid-postemergence (MP) to corn at the V4 growth stage on June 20.

<sup>‡</sup>The untreated control was not included in the ANOVA for percent injury.

<sup>§</sup>Corn was harvested November 11 and yields were adjusted to 12 percent moisture content.

Table 3. Weed control with Impact® herbicide in combinations with other herbicides applied in field corn, Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.

Treatment	Rate* lb ai/acre % v/v	Timing†	Weed control‡				
			Pigweed spp§	C. lambs-quarters	H. night-shade	Kochia	Barnyard-grass
			----- % -----				
Untreated	--	--	-	-	-	-	-
Dual II Magnum	1.43	PRE	86	79	79	63	96
Dual II Magnum fb Impact + AAtrex + MSO + 32% N	1.43 0.016 + 0.5 + 1.0% + 2.5%	PRE MP	100	100	100	100	100
Dual II Magnum fb Callisto + AAtrex + COC + 32% N	1.43 0.094 + 0.25 + 1.0% + 2.5%	PRE MP	100	100	100	100	97
Dual II Magnum fb Clarity + NIS + 32% N	1.43 0.25 + 1.0% + 2.5%	PRE MP	100	100	100	100	96
Dual II Magnum fb Option + MSO + 32% N	1.43 0.066 + 1.0% + 2.5%	PRE MP	100	100	100	100	100
Outlook fb Impact + AAtrex + MSO + 32% N	0.75 0.016 + 0.5 + 1.0% + 2.5%	PRE MP	100	100	100	100	100
LSD (0.05)			8	11	10	11	NS

\*Herbicide rates are in lb ai/acre. Additive rates are in percent v/v.

†Application timings were preemergence (PRE) on May 26 and mid-postemergence (MP) applied to corn at the V4 growth stage on June 18.

‡Weed control was evaluated July 18. The untreated control was not included in the ANOVA for weed control.

§Pigweed species were a mixture of Powell amaranth and redroot pigweed.

Table 4. Injury, height, and yield with Impact<sup>®</sup> herbicide applied in field corn, Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.

Treatment	Rate* lb ai/acre % v/v	Timing <sup>†</sup>	Field corn				Yield <sup>§</sup> bu/acre
			Injury <sup>‡</sup>		Height		
			6-24 ----- % -----	7-5 ----- % -----	6-28 -----in-----	7-5 -----in-----	
Untreated	--	--	--	--	25.4	41.7	238
Dual II Magnum	1.43	PRE	0	0	24.8	41.9	246
Dual II Magnum fb Impact + AAtrex + MSO + 32% N	1.43 0.016 + 0.5 + 1.0% + 2.5%	PRE MP	0	4	24.1	42.3	254
Dual II Magnum fb Callisto + AAtrex + COC + 32% N	1.43 0.094 + 0.25 + 1.0% + 2.5%	PRE MP	0	11	24.3	38.7	256
Dual II Magnum fb Clarity + NIS + 32% N	1.43 0.25 + 1.0% + 2.5%	PRE MP	9	18	23.1	41.3	250
Dual II Magnum fb Option + MSO + 32% N	1.43 0.066 + 1.0% + 2.5%	PRE MP	34	21	21.0	40.0	250
Outlook fb Impact + AAtrex + MSO + 32% N	0.75 0.016 + 0.5 + 1.0% + 2.5%	PRE MP	0	8	24.0	42.4	246
LSD (0.05)			3	12	1.5	NS	NS

\*Herbicide rates are in lb ai/acre. Additive rates are in percent v/v.

<sup>†</sup>Application timings were preemergence (PRE) on May 26 and mid-postemergence (MP) applied to corn at the V4 growth stage on June 18.

<sup>‡</sup>The untreated control was not included in the ANOVA for percent injury.

<sup>§</sup>Corn was harvested November 11 and yields were adjusted to 12 percent moisture content.