Kansas Agricultural Experiment Station Research Reports

Volume 7
Issue 7 *Southwest Research-Extension Reports*

Article 14

2021

Impact and Liberty Rates and Mixtures for Efficacy in Corn

R. S. Currie
Kansas State University, rscurrie@ksu.edu

P. W. Geier
Kansas State University, pgeier@k-state.edu

Recommended Citation

Currie, R. S. and Geier, P. W. (2021) "Impact and Liberty Rates and Mixtures for Efficacy in Corn," *Kansas Agricultural Experiment Station Research Reports*: Vol. 7: Iss. 7. https://doi.org/10.4148/2378-5977.8113

Impact and Liberty Rates and Mixtures for Efficacy in Corn

Abstract

The objective of the study was to compare Impact (topramezone), Liberty (glufosinate) and a premixture of the two herbicides (Sinate) for efficacy in corn. Rates for each herbicide were 0.75 and 1.0 oz/a for Impact, 22 and 30 oz/a for Liberty, and 21 and 28 oz/a for Sinate. Impact and Sinate, each at the high rates, and Status plus glyphosate provided the best kochia control for corn late in the season. These treatments, along with the low rate of Impact controlled crabgrass the best. Status was also the best treatment for Russian thistle, Palmer amaranth, and green foxtail control. The high rate of Impact also controlled Russian thistle well, whereas the high rate of Sinate provided good foxtail control. Most herbicide treatments increased grain yields relative to the untreated control, but yields were decidedly greater with Status plus glyphosate.

Keywords

herbicide resistance, corn

Impact and Liberty Rates and Mixtures for Efficacy in Corn

R.S. Currie and P.W. Geier

Summary

The objective of the study was to compare Impact (topramezone), Liberty (glufosinate) and a premixture of the two herbicides (Sinate) for efficacy in corn. Rates for each herbicide were 0.75 and 1.0 oz/a for Impact, 22 and 30 oz/a for Liberty, and 21 and 28 oz/a for Sinate. Impact and Sinate, each at the high rates, and Status plus glyphosate provided the best kochia control for corn late in the season. These treatments, along with the low rate of Impact controlled crabgrass the best. Status was also the best treatment for Russian thistle, Palmer amaranth, and green foxtail control. The high rate of Impact also controlled Russian thistle well, whereas the high rate of Sinate provided good foxtail control. Most herbicide treatments increased grain yields relative to the untreated control, but yields were decidedly greater with Status plus glyphosate.

Introduction

The recent development of glyphosate-resistant (GR) weeds has caused many producers to seek new ways of controlling weeds postemergence (POST) in corn. Two potential herbicides that may help control GR weeds are Impact and Liberty. Impact controls many broadleaf and select grass weeds, whereas Liberty has broad-spectrum efficacy on both grasses and broadleaves. The objective of this study was to compare Impact and Liberty alone or as a premixture at two rates for postemergence efficacy in corn.

Material and Methods

An experiment was conducted at the Kansas State University Southwest Research-Extension Center near Garden City, KS, to evaluate Impact (topramezone) and Liberty (glufosinate) rates alone and in a premix for postemergence efficacy in glufosinate-tolerant corn. Herbicides (Table 2) were applied using a tractor-mounted, compressed CO_2 sprayer delivering 19.4 gpa at 30 psi and 4.1 mph. Application, environmental, and weed information are shown in Table 1. Plots were 10 by 35 feet and arranged in a randomized complete block design with four replications. Soil was a Beeler silt loam with 2.4% organic matter and pH of 7.6. Visual estimates of weed control were taken on June 11 and July 1, 2020. These dates were 8 and 28 days after treatment (DAT), respectively. Corn yields were determined on October 3, 2020 by mechanically harvesting the center two rows of each plot and adjusting grain weights to 15.5% moisture.

Results and Discussion

At 8 DAT, only Sinate (topramezone/glufosinate) at 28 oz/a controlled kochia as much as 80% (Table 2). This treatment, along with Impact alone at 1.0 oz/a and Status (dicamba/diflufenzopyr) plus glyphosate, controlled kochia best at 28 DAT. No treatment controlled Russian thistle more than 81% at 8 DAT, but the high rate of Impact alone and Status plus glyphosate each provided greater than 90% control at 28 DAT. Likewise, Palmer amaranth control was less than 85% regardless of treatment at 8 DAT. Only Status plus glyphosate controlled Palmer amaranth more than 75% at 28 DAT. Sinate at 28 oz/a and Status provided the best green foxtail control at 28 DAT (Table 3). These treatments along with Impact alone at either rate were the most efficacious treatments for crabgrass control at 28 DAT. In most cases, increasing the rate of Impact, Liberty, or Sinate did not improve control of the weed species studied. All herbicide treatments, except Sinate at the low rate, resulted in higher grain yields than the untreated control. However, only the treatment of Status with glyphosate resulted in yields higher (115.2 bu/a) than 62 bu/a.

Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned. Persons using such products assume responsibility for their use in accordance with current label directions of the manufacturer.

Table 1. Application, environmental, and weed information for the Impact and Liberty study in corn

Application timing	Postemergence
Application date	June 3, 2020
Air temperature (°F)	97
Relative humidity	24
Soil temperature (°F)	84
Wind speed (mph)	2 to 6
Wind direction	North
Soil moisture	Fair
Corn	
Height (inches)	5 to 8
Leaves (no.)	3 to 4
Kochia	
Height (inches)	2 to 6
Density (plants/10 ft^2)	20
Palmer amaranth	
Height (inches)	1 to 5
Density (plants/10 ft^2)	30
Russian thistle	
Height (inches)	3 to 6
Density (plants/10 ft^2)	5
Green foxtail	
Height (inches)	1 to 3
Density (plants/10 ft^2)	10
Crabgrass	
Height (inches)	0.5 to 1
Density (plants/10 ft^2)	3

Table 2. Broadleaf weed control in the Impact and Liberty corn trial

		Kochia		Russian thistle		Palmer amaranth	
Treatment[1]	**Rate**	**8 DAT[2]**	**28 DAT**	**8 DAT**	**28 DAT**	**8 DAT**	**28 DAT**
	oz/a	---------- % Visual ----------					
Impact MSO AMS	0.75 1.0% 3.0	70	78	68	83	65	68
Impact MSO AMS	1.0 1.0% 3.0	73	80	73	93	68	75
Liberty AMS	22 3.0	63	65	68	68	75	65
Liberty AMS	30 3.0	70	65	75	70	83	68
Sinate MSO AMS	21 1.0% 3.0	73	75	73	78	75	65
Sinate MSO AMS	28 1.0% 3.0	80	80	81	85	83	75
Status Glyphosate NIS AMS	5.0 32 0.25% 3.0	60	88	60	95	65	88
LSD (0.05)		7	8	9	8	8	8

[1] MSO = methylated seed oil. AMS = ammonium sulfate. NIS = nonionic surfactant.

[2] DAT = days after treatment.

Table 3. Grass weed control and corn yield in the Impact and Liberty trial

Treatment[1]	Rate	Green foxtail		Crabgrass		Corn yield
		8 DAT[2]	28 DAT	8 DAT	28 DAT	
	oz/a	---------- % Visual ----------				bu/a
Untreated	---	---	---	---	---	8.4
Impact MSO AMS	0.75 1.0% 3.0	63	83	65	88	43.4
Impact MSO AMS	1.0 1.0% 3.0	63	85	63	90	61.2
Liberty AMS	22 3.0	78	70	65	73	35.7
Liberty AMS	30 3.0	83	80	80	80	41.1
Sinate MSO AMS	21 1.0% 3.0	80	75	78	83	34.1
Sinate MSO AMS	28 1.0% 3.0	81	90	80	88	45.0
Status Glyphosate NIS AMS	5.0 32 0.25% 3.0	78	96	73	91	115.2
LSD (0.05)		9	11	8	7	26.5

[1] MSO = methylated seed oil. AMS = ammonium sulfate. NIS = nonionic surfactant.

[2] DAT = days after treatment.

Figure 1. Untreated control.

Figure 2. Impact at 1.0 oz/a applied postemergence. Photo taken 36 days after treatment.

Figure 3. Liberty at 30 oz/a applied postemergence. Photo taken 36 days after treatment.

Figure 4. Sinate at 28 oz/a applied postemergence. Photo taken 36 days after treatment.

Figure 5. Status at 5 oz/a plus glyphosate at 32 oz/a applied postemergence. Photo taken 36 days after treatment.