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Clarity, Laudis, Diflexx Duo, Atrazine, and Glyphosate for Efficacy in Corn

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Summary

A study was initiated near Garden City, KS, in 2016 comparing the weed control of several herbicide treatments in irrigated corn. Control of quinoa, Russian thistle, and kochia was excellent with all herbicide treatments, and late-season control of common sunflower was 100% with all treatments except for those applied preemergence alone. Most treatments controlled green foxtail 95% or more, except Corvus (isoxaflutole + thiencarbazone) plus atrazine preemergence, or the early postemergence (EPOST) treatments containing Liberty 280 (glufosinate). Liberty 280 severely injured the non-Liberty Link corn in this trial, but all other herbicide-treated corn yielded 21 to 45 bu/a more grain than untreated corn.

Introduction

Various commercial herbicides containing isoxaflutole (Balance Flexx, Corvus), thiencarbazone (Capreno, Corvus), tembotrione (Diflexx Duo, Laudis), and dicamba (Clarity, Diflexx Duo) have shown good results in providing weed control with either preemergence or postemergence applications. The objective of this study was to evaluate these products along with atrazine, glyphosate, Liberty 280, and Halex GT (metolachlor + glyphosate + mesotrione) in a single or sequential program for efficacy in corn.

Procedures

An experiment conducted at the Kansas State University Southwest Research-Extension Center near Garden City, KS, evaluated the efficacy of preemergence (PRE), early postemergence (EPOST), and sequential (preemergence followed by postemergence) herbicides in corn. All herbicide treatments were applied using a compressed-CO_2 backpack sprayer, delivering 20 GPA at 3.0 mph and 27 psi. Application dates and environmental conditions are given in Table 1. Soil was a Ulysses silt loam with pH 8.0, 1.4% organic matter and cation exchange capacity of 18.4. Plot size was 10- by 35-feet. The experiment was a randomized complete block with each treatment replicated four times. Visual weed control was determined on June 3 and July 7, 2016, which was 9 days after early postemergence and 31 days after the postemergence treatments, respectively. Corn yields were determined September 26, 2016, by mechanically harvesting the center two rows of each plot and adjusting grain moisture to 15.5%.

Results and Discussion

Control of quinoa and Russian thistle was 100% regardless of herbicide treatment or evaluation date (data not shown). Kochia control was 95% or more on June 3 regardless of herbicide treatment and 100% by July 7. Common sunflower control was 100% with all EPOST and sequential treatments on July 7, whereas green foxtail control was 95% or more on July 7, except with Corvus plus atrazine preemergence or the EPOST treatments containing Liberty 280. No visible corn injury was observed with any treatment except those containing Liberty 280. The intent of this study was to plant a corn variety resistant to glufosinate. However, a glufosinate-susceptible variety was mistakenly planted. Therefore, Liberty-containing treatments caused 68 to 70 and 88 to 91% corn injury June 3 and July 7, respectively (data not shown). The high degree of corn injury with the Liberty treatments severely limited corn yield. All other herbicide-treated corn yielded 21 to 45 bu/a more grain than untreated corn.

Table 1. Application information

Application timing	Preemergence	Early postemergence	Postemergence
Application date	April 28, 2016	May 25, 2016	June 6, 2016
Air temperature (°F)	42	64	75
Relative humidity (%)	62	77	40
Soil temperature (°F)	53	65	69
Wind speed (mph)	5 to 8	4 to 6	5 to 7
Wind direction	North	West-northwest	South
Soil moisture	Good	Good	Good

Table 2. Clarity, Laudis, Diflexx Duo, atrazine, and glyphosate in corn

			Kochia		Common sunflower		Green foxtail		Grain
Treatment[a]	Rate	Timing[b]	June 3	July 7	June 3	July 7	June 3	July 7	yield
	per a		% control						bu/a
Balance Flexx	4 oz	PRE	100	100	86	86	100	99	232
Harness Xtra 6.0	2.4 qt	PRE							
Corvus	5.6 oz	PRE	100	100	90	85	91	86	226
Atrazine	32 oz	PRE							
Balance Flexx	3 oz	PRE	100	100	78	100	90	99	234
Atrazine	32 oz	PRE							
Glyphosate	32 oz	POST							
Capreno	3 oz	POST							
Atrazine	16 oz	POST							
Clarity	8 oz	POST							
Superb HC	0.5%	POST							
AMS	2 lb	POST							

continued

Table 2. Clarity, Laudis, Diflexx Duo, atrazine, and glyphosate in corn

Treatment[a]	Rate	Timing[b]	Kochia		Common sunflower		Green foxtail		Grain yield
			June 3	July 7	June 3	July 7	June 3	July 7	
	per a		% control						bu/a
Corvus	3.3 oz	PRE	100	100	94	100	89	100	221
Atrazine	32 oz	PRE							
Glyphosate	32 oz	POST							
Laudis	3 oz	POST							
Atrazine	16 oz	POST							
Clarity	8 oz	POST							
Destiny HC	1%	POST							
AMS	2 lb	POST							
Corvus	3.3 oz	PRE	100	100	89	100	91	100	231
Atrazine	32 oz	PRE							
Glyphosate	32 oz	POST							
Diflexx Duo	24 oz	POST							
Atrazine	16 oz	POST							
Destiny HC	1%	POST							
AMS	2 lb	POST							
Halex GT	3.6 pt	EPOST	95	100	100	100	100	95	230
Diflexx	8 oz	EPOST							
NIS	0.25%	EPOST							
AMS	3 lb	EPOST							
Liberty 280	29 oz	EPOST	96	100	100	100	98	65	53
Diflexx Duo	24 oz	EPOST							
Atrazine	32 oz	EPOST							
AMS	3 lb	EPOST							
Liberty 280	29 oz	EPOST	100	100	100	100	97	75	17
Capreno	3 oz	EPOST							
Atrazine	32 oz	EPOST							
AMS	3 lb	EPOST							
Glyphosate	32 oz	EPOST	99	100	100	100	100	95	245
Capreno	3 oz	EPOST							
Atrazine	32 oz	EPOST							
Clarity	8 oz	EPOST							
Superb HC	0.5%	EPOST							
AMS	2 lb	EPOST							
Untreated	---	---	0	0	0	0	0	0	200
LSD (0.05)			3	NS	9	6	5	5	13.1

[a] AMS is ammonium sulfate, and NIS is nonionic surfactant.
[b] PRE is preemergence, POST is postemergence, and EPOST is early postemergence.
LSD = Least significant difference.

Figure 1. Untreated control.

Figure 2. Balance Flexx 4 oz + Harness Xtra 6.0 2.4 qt applied preemergence, 70 days after application.

Figure 3. Corvus 5.6 oz + atrazine 32 oz applied preemergence, 70 days after application.

Figure 4. Corvus 3.3 oz + atrazine 32 oz applied preemergence followed by glyphosate 32 oz + Laudis 3 oz + atrazine 16 oz + Clarity 8 oz applied postemergence, 31 days after postemergence application.

Figure 5. Glyphosate 32 oz + Capreno 3 oz + atrazine 32 oz + Clarity applied early postemergence, 43 days after application.