K-STATE Research and Extension

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Single and Sequential Applications of Anthem Maxx, Solstice, Acuron, Balance Flexx, Corvus, Halex GT, Verdict, Sharpen, Glyphosate, and Atrazine in Irrigated Corn

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Summary

A study was initiated near Garden City, KS, in 2016, comparing the weed control of several herbicide treatments and their sequential application for weed control in irrigated corn. Quinoa and common sunflower control was excellent. All sequential herbicide treatments provided excellent control of kochia, velvetleaf, Palmer amaranth, and green foxtail. Single applications at the V4 stage, although still good, showed a reduced level of Palmer amaranth and green foxtail control compared to sequential treatments.

Introduction

Acuron (metolachlor + atrazine + mesotrione + bicyclopyrone), Anthem Maxx (pyroxasulfone + fluthiacet), Balance Flexx (isoxaflutole), Corvus (isoxaflutole + thiencarbazone), Halex GT (metolachlor + glyphosate + mesotrione), Sharpen (saflufenacil), Solstice (fluthiacet + mesotrione), and Verdict (saflufenacil + dimethenamid) have all been shown to provide excellent broad spectrum weed control in irrigated corn. Head-to-head comparisons of these tank mixes with local weed populations are needed. Therefore, it was the objective of this trial to compare the weed control of these products under statistically replicated conditions.

Experimental Procedures

An experiment conducted at the Kansas State University Southwest Research-Extension Center near Garden City, KS, evaluated the efficacy of single and sequential herbicide applications in corn. The entire plot area was over-seeded with foxtail, crabgrass, and Palmer amaranth, as well as the domestically cultivated sorghum 'Rox orange,' quinoa, and sunflowers. These serve as proxies for their wild relatives, shattercane, lambsquarters, and wild sunflowers, respectively. Treatments were applied preemergence followed by early postemergence (V4) or postemergence (V8) or as early postemergence (V4) alone. All herbicides were applied using a tractor-mounted, compressed-CO_2 sprayer, delivering 20 GPA at 3.0 mph and 30 psi. Soil was a Ulysses silt loam with 1.4% organic matter, pH of 8.0, and cation exchange capacity of 18.4. Plots were 10 by 35 feet and arranged in a randomized complete block design with four replications. Visual weed control was determined July 13, 2016, which was 27 days after the V8 applications (DAPO). Grain yields were determined September 20, 2016, by mechanically harvesting the center two rows of each plot and adjusting the weights to 15.5% moisture.

Results and Discussion

Quinoa and common sunflower control was 100% regardless of treatment at 27 DAPO (data not shown). All herbicides provided excellent control of kochia, velvetleaf, Palmer amaranth, and green foxtail when applied as sequential treatments. Single applications at the V4 stage, although still good, did not control Palmer amaranth and green foxtail as well as the sequential treatments. Herbicide-treated corn yielded 179 to 197 bu/a but did not differ between treatments. Untreated corn yielded 188 bu/a (data not shown).

Table 1. Application information

Application timing	Preemergence	V4 corn	V8 corn
Application date	May 6, 2016	June 2, 2016	June 16, 2016
Air temperature (°F)	60	76	79
Relative humidity (%)	55	47	46
Soil temperature (°F)	57	64	72
Wind speed (mph)	8 to 10	4 to 6	7 to 10
Wind direction	South	South	South
Soil moisture	Good	Good	Good

Table 2. Anthem Maxx, Solstice, and atrazine in corn

			Kochia	Velvetleaf	Palmer amaranth	Green foxtail
Treatment[a]	Rate	Timing[b]	27 DAPO[c]	27 DAPO	27 DAPO	27 DAPO
	per a		% control			
Anthem Maxx	4 oz	PRE	100	100	100	96
Solstice	2.5 oz	V4				
Atrazine	32 oz	V4				
Glyphosate	32 oz	V4				
COC	0.5%	V4				
AMS	1%	V4				
Anthem Maxx	4 oz	PRE	100	100	98	98
Atrazine	32 oz	PRE				
Solstice	2.5 oz	V4				
Atrazine	16 oz	V4				
Glyphosate	32 oz	V4				
COC	0.5%	V4				
AMS	1%	V4				
Anthem Maxx	4 oz	PRE	100	99	100	100
Atrazine	32 oz	PRE				
Balance Flexx	2 oz	PRE				
Glyphosate	32 oz	V4				
AMS	1%	V4				

continued

Table 2. Anthem Maxx, Solstice, and atrazine in corn

Treatment[a]	Rate	Timing[b]	Kochia	Velvetleaf	Palmer amaranth	Green foxtail
			27 DAPO[c]	27 DAPO	27 DAPO	27 DAPO
	per a		% control			
Verdict	16 oz	PRE	93	98	99	100
Glyphosate	32 oz	V8				
AMS	1%	V8				
Anthem Maxx	4 oz	PRE	98	98	100	100
Sharpen	2 oz	PRE				
Glyphosate	32 oz	V8				
AMS	1%	V8				
Anthem Maxx	4 oz	PRE	100	100	100	100
Balance Flexx	3 oz	PRE				
Glyphosate	32 oz	V8				
AMS	1%	V8				
Halex GT	3.6 pt	V4	98	100	93	95
NIS	0.25%	V4				
AMS	1%	V4				
Solstice	3.2 oz	V4	100	100	89	88
Atrazine	32 oz	V4				
Glyphosate	32 oz	V4				
COC	0.5%	V4				
AMS	1%	V4				
Solstice	2.5 oz	V4	98	100	83	85
Anthem Maxx	2 oz	V4				
Glyphosate	32 oz	V4				
COC	0.5%	V4				
Solstice	2.5 oz	V4	100	100	91	91
Anthem Maxx	2 oz	V4				
Atrazine	16 oz	V4				
Glyphosate COC	32 oz	V4				
	0.5%	V4				
Anthem Maxx	4 oz	PRE	100	100	100	100
Atrazine	32 oz	PRE				
Glyphosate	32 oz	V8				
AMS	1%	V8				
Acuron	2.5 qt	PRE	100	100	100	100
Glyphosate	32 oz	V8				
AMS	1%	V8				
Corvus	5.6 oz	PRE	100	100	100	100
Atrazine	32 oz	PRE				
Glyphosate	32 oz	V8				
AMS	1%	V8				
Untreated	---	---	0	0	0	0
Least significant difference (0.05)			4	3	5	4

[a] AMS is ammonium sulfate, COC is crop oil concentrate, and NIS is nonionic surfactant.
[b] PRE is preemergence, V4 is corn with 4 visible leaf collars, and V8 is corn with 8 visible leaf collars.
[c] DAPO is days after V8 applications.

Figure 1. Untreated control.

Figure 2. Anthem Maxx 4 oz preemergence followed by Solstice 2.5 oz + atrazine 32 oz + glyphosate 32 oz early postemergence, 41 days after early postemergence application.

Figure 3. Anthem Maxx 4 oz + Sharpen 2 oz preemergence followed by glyphosate postemergence, 27 days after postemergence application.

Figure 4. Solstice 3.2 oz + atrazine 32 oz +glyphosate 32 early postemergence, 41 days after early postemergence application.

Figure 5. Anthem Maxx 4 oz + atrazine 32 oz preemergence followed by glyphosate postemergence, 27 days after postemergence application.