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Armezon Pro, Status, Verdict, Glyphosate, Zidua, and Atrazine for Sequential Weed Control in Glyphosate-Resistant Corn

R.S. Currie and P.W. Geier

Summary

A study was initiated near Garden City, KS, in 2016, comparing the weed control of several herbicide treatments applied sequentially in irrigated corn. Kochia control was 95% or more with all treatments at 1 day after late postemergence application (1 DALP) and 100% regardless of treatment at 63 days after late postemergence application (63 DALP). Palmer amaranth and green foxtail control was 98 to 100% and 83 to 93%, respectively, with all preemergence treatments at 1 DALP. A second late postemergence application was needed to achieve 100% control of Palmer amaranth and green foxtail 63 DALP. The single early postemergence treatment controlled Palmer amaranth and green foxtail 90 and 91% at 63 DALP.

Introduction

Armezon Pro (topramezone + dimethenamid), Status (dicamba + diflufenzopyr), Verdict (saflufenacil + dimethenamid), and Zidua (pyroxasulfone) have all been shown to provide excellent weed control in corn. The impact of exact timings of multiple applications of these products under local conditions is not clearly understood. Therefore, it was the objective of this study to measure various tank mix combinations of these products and various times of application.

Experimental Procedures

An experiment conducted at the Kansas State University Southwest Research-Extension Center near Garden City, KS, evaluated sequential preemergence followed by postemergence herbicide applications for weed control 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. A single early postemergence (EP) treatment was included for comparison purposes and was applied when the corn had two visible leaf collars (V2). The late postemergence treatments (LP) were applied when corn had five visible leaf collars (V5). Application dates and environmental conditions are shown in Table 1. All herbicides were applied using a tractor-mounted or backpack sprayer, delivering 19.5 or 20 GPA at 3.0 mph and 30 or 27 psi. Plot sizes were 10- by 35-feet and were arranged in a randomized complete block design with four replications. Soil was a Ulysses silt loam with 1.4% organic matter, pH of 8.0, and cation exchange capacity of 18.4. Visual weed control was determined June

17 and August 18, 2016, which was 1 and 63 days after the late postemergence applications. Yields were determined on September 26, 2016, by mechanically harvesting the center two rows of each plot and adjusting grain weights to 15.5% moisture.

Results and Discussion

Quinoa and common sunflower control was 98 to 100% regardless of treatment or evaluation date (data not shown). Kochia control was 95% or more with all treatments at 1 DALP, and 100% regardless of treatment at 63 DALP. Palmer amaranth and green foxtail control was 93 to 100% and 83 to 93%, respectively, with all treatments at 1 DALP. However, complete control of Palmer amaranth and green foxtail occurred with all sequential treatments at 63 DALP. The single early postemergence treatment controlled Palmer amaranth and green foxtail 90 and 91% at 63 DALP. Herbicide-treated corn yielded 180 to 193 bu/a but did not differ between treatments and did not differ from the yield of the untreated control (data not shown).

Table 1. Application information

Application timing	Preemergence	Early postemergence	Postemergence
Application date	May 13, 2016	June 1, 2016	June 16, 2016
Air temperature (°F)	80	66	75
Relative humidity (%)	36	61	52
Soil temperature (°F)	63	61	73
Wind speed (mph)	6 to 9	2 to 4	6 to 8
Wind direction	West-southwest	West	South
Soil moisture	Good	Excellent	Good

Table 2. Armezon Pro, Status, Verdict, and atrazine in corn

			Kochia		Palmer amaranth		Green foxtail	
Treatment[a]	Rate	Timing[b]	1 DALP[c]	63 DALP	1 DALP	63 DALP	1 DALP	63 DALP
	oz/a		% control					
Verdict	10	PRE	100	100	98	100	88	100
Atrazine	16	PRE						
Status	5	LP						
Atrazine	16	LP						
Glyphosate	32	LP						
MSO	1%	LP						
AMS	2%	LP						
Verdict	10	PRE	100	100	100	100	83	100
Atrazine	16	PRE						
Armezon Pro	16	LP						
Atrazine	16	LP						
Glyphosate	32	LP						
COC	1%	LP						
AMS	2%	LP						
Verdict	7.5	PRE	95	100	96	100	84	100
Atrazine	16	PRE						
Armezon Pro	20	LP						
Atrazine	16	LP						
Glyphosate	32	LP						
COC	1%	LP						
AMS	2%	LP						
Zidua	3.3	PRE	100	100	98	100	93	100
Sharpen	2	PRE						
Atrazine	16	PRE						
Armezon Pro	20	LP						
Atrazine	16	LP						
Glyphosate	32	LP						
COC	1%	LP						
AMS	2%	LP						
Armezon Pro	20	EP	98	100	93	90	91	91
Atrazine	16	EP						
Glyphosate	32	EP						
COC	1%	EP						
AMS	2%	EP						
Untreated	---		0	0	0	0	0	0
Least significant difference (0.05)			4	NS	6	3	5	3

[a] AMS is ammonium sulfate, COC is crop oil concentrate, and MSO is methylated seed oil.
[b] PRE is preemergence, EP is early postemergence to corn with 2 visible leaf collars, and LP is late postemergence to corn with 5 visible leaf collars.
[c] DALP is days after late post emergence applications.

Figure 1. Untreated control.

Figure 2. Verdict 10 oz + atrazine 16 preemergence followed by Status 5 oz + atrazine 16 oz + glyphosate 32 oz postemergence, 27 days after postemergence application.

Figure 3. Verdict 10 oz + atrazine 16 oz preemergence followed by Armezon Pro 16 oz + atrazine 16 oz + glyphosate 32 oz postemergence, 27 days after postemergence application.

Figure 4. Verdict 7.5 oz + atrazine 16 oz preemergence followed by Armezon Pro 20 oz + atrazine 16 oz + glyphosate 32 oz postemergence, 27 days after postemergence application.

Figure 5. Zidua 3.3 oz + Sharpen 2 oz + atrazine 16 oz preemergence followed by Armezon Pro 20 oz + atrazine 16 oz + glyphosate 32 oz postemergence, 27 days after postemergence application.

Figure 6. Armezon Pro 20 oz + atrazine 16 oz + glyphosate 32 oz early postemergence, 42 days after application.