

Efficacy of Preplant and Early Postemergence Herbicides in 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 for weed control in irrigated corn. Acuron (metolachlor + atrazine + mesotrione + bicyclopyrone), Clarity (dicamba), Corvus (isoxaflutole + thiencazone), Halex GT (metolachlor + glyphosate + mesotrione), and Lumax EZ (metolachlor + atrazine + mesotrione) were compared when combined at various ratios and timings. All combinations gave similar levels of weed control, allowing a producer to compare these tank mixes head-to-head based on prices alone.

Introduction

Acuron, Clarity, Corvus, Halex GT, and Lumax EZ are very competitive herbicides for weed control in corn. Therefore, it was the objective of this study to measure various combinations and times of applications of these products to allow economic comparisons.

Experimental Procedures

An experiment conducted at the Kansas State University Southwest Research-Extension Center near Garden City, KS, evaluated weed control with single and sequential herbicide treatments 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. Single treatments were applied on May 23, 2016, which was 11 days prior to planting (11 DPP); sequential treatments consisted of 11 DPP treatments followed by early postemergence treatments applied on June 17, 2016. The early postemergence treatments were applied when corn had two true leaves (V2). All herbicides were applied using a tractor-mounted, compressed-CO₂ sprayer delivering 20 GPA at 3.0 mph and 30 psi. Plots were 10- by 35-feet, and treatments were arranged in a randomized complete block 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 on June 2 and August 18, 2016, which was 10 days after the preplant applications (10 DAPP) and 62 days after the early postemergence applications (62 DAPO), respectively. Corn yield was determined September 29, 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 95 to 100% regardless of treatment or evaluation date (data not shown), while kochia control was 97% or more. At 62 DAPO, Palmer amaranth control was greater than 96% with all herbicides, except Corvus plus atrazine and glyphosate applied 11 DPP (93%). Green foxtail control was generally best (95 to 99%) when sequential herbicides were applied. Corn yields ranged from 138 to 167 bu/a and did not differ between

any treatment (data not shown). All herbicide combinations gave similar levels of weed control, allowing producers to compare these tank mixes head-to-head based upon prices alone.

Table 1. Preplant and early postemergence herbicides in corn

Treatment ^a	Rate	Timing ^b	Kochia		Palmer amaranth		Green foxtail	
			10 DAPP ^c	62 DAPO ^c	10 DAPP	62 DAPO	10 DAPP	62 DAPO
	per a		----- % control -----					
Glyphosate	28 oz	11 DPP	0	0	0	0	0	0
AMS	2%	11 DPP						
Acuron	2.5 qt	11 DPP	99	100	100	100	99	89
Atrazine	0.4 qt	11 DPP						
Glyphosate	28 oz	11 DPP						
AMS	2%	11 DPP						
Acuron	2.5 qt	11 DPP	100	100	100	100	100	93
Atrazine	0.4 qt	11 DPP						
Clarity	6 oz	11 DPP						
2,4-D ester	6 oz	11 DPP						
Glyphosate	28 oz	11 DPP						
AMS	2%	11 DPP						
Acuron	1.5 qt	11 DPP	100	100	95	97	100	95
Atrazine	0.25 qt	11 DPP						
Glyphosate	28 oz	11 DPP						
AMS	2%	11 DPP						
Halex GT	3.6 pt	V2						
Atrazine	0.5 qt	V2						
NIS	0.25%	V2						
AMS	2%	V2						
Acuron	1.5 qt	11 DPP	99	100	100	99	100	97
Atrazine	0.25 qt	11 DPP						
Clarity	6 oz	11 DPP						
2,4-D ester	6 oz	11 DPP						
Glyphosate	28 oz	11 DPP						
AMS	2%	11 DPP						
Halex GT	3.6 pt	V2						
Atrazine	0.5 qt	V2						
NIS	0.25%	V2						
AMS	2%	V2						
Acuron	1.25 qt	11 DPP	99	100	100	98	100	98
Atrazine	0.2 qt	11 DPP						
Glyphosate	28 oz	11 DPP						
AMS	2%	11 DPP						
Acuron	1.25 qt	V2						
Atrazine	0.2 qt	V2						
Glyphosate	28 oz	V2						
AMS	2%	V2						

continued

Table 1. Preplant and early postemergence herbicides in corn

Treatment ^a	Rate	Timing ^b	Kochia		Palmer amaranth		Green foxtail	
			10 DAPP ^c	62 DAPO ^c	10 DAPP	62 DAPO	10 DAPP	62 DAPO
	per a		----- % control -----					
Acuron	1.25 qt	11 DPP	100	100	100	98	100	99
Atrazine	0.2 qt	11 DPP						
Clarity	6 oz	11 DPP						
2,4-D ester	6 oz	11 DPP						
Glyphosate	28 oz	11 DPP						
AMS	2%	11 DPP						
Acuron	1.25 qt	V2						
Atrazine	0.2 qt	V2						
Glyphosate	28 oz	V2						
AMS	2%	V2						
Lumax EZ	2.7 qt	11 DPP	100	100	100	98	100	88
Atrazine	0.4 qt	11 DPP						
Glyphosate	28 oz	11 DPP						
AMS	2%	11 DPP						
Corvus	5.6 oz	11 DPP	98	97	97	93	100	92
Atrazine	1.0 qt	11 DPP						
Glyphosate	28 oz	11 DPP						
AMS	2%	11 DPP						
Least significant difference (0.05)			2	2	4	4	1	6

^a AMS is ammonium sulfate and NIS is nonionic surfactant.

^b 11 DPP is 11 days prior to corn planting and V2 is corn with 2 visible leaf collars.

^c DAPP is days after DPP applications, and DAPO is days after V2 application.



Figure 1. Glyphosate 28 oz applied 11 days preplant, 45 days after application.



Figure 2. Acuron 2.5 qt + atrazine 0.4 qt + glyphosate 28 oz applied 11 days preplant, 45 days after application.



Figure 3. Acuron 1.5 qt + atrazine 0.25 qt + glyphosate 28 oz applied 11 days preplant followed by Halex GT 3.6 pt + atrazine 0.5 qt applied postemergence, 20 days after postemergence application.



Figure 4. Acuron 1.25 qt + atrazine 0.2 qt + glyphosate 28 oz applied 11 days preplant followed by Acuron 1.25 qt + atrazine 0.2 qt + glyphosate applied postemergence, 20 days after postemergence application.



Figure 5. Lumax EZ 2.7 qt + atrazine 0.4 qt + glyphosate 28 oz applied 11 days preplant, 45 days after application.