Kansas Agricultural Experiment Station Research Reports

Volume 1
Issue 5 *Southwest Research-Extension Center Reports*

Article 14

January 2015

Efficacy of Lumax EZ, Atrazine, Acuron, Armezon, Sharpen, Outlook, Verdict, and Prowl H2O in Irrigated Glyphosate-Resistant Corn

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Recommended Citation

Currie, R. and Geier, P. (2015) "Efficacy of Lumax EZ, Atrazine, Acuron, Armezon, Sharpen, Outlook, Verdict, and Prowl H2O in Irrigated Glyphosate-Resistant Corn," *Kansas Agricultural Experiment Station Research Reports*: Vol. 1: Iss. 5. https://doi.org/10.4148/2378-5977.1081

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Abstract

All treatments provided statistically superior control of Palmer amaranth compared to the control or a single application of glyphosate. All treatments provided excellent control of all other weed species. Although all herbicide tank mixes elevated corn yield compared to the control, there were no statistically significant differences among herbicides in their ability to do so.

Keywords

weed science, weed control, irrigated glyphosate-resistant corn, tank mixes, herbicide, Lumax EZ, atrazine, Acuron, Armezon, Sharpen, Outlook, Verdict, Prowl H2O, Palmer amaranth

Efficacy of Lumax EZ, Atrazine, Acuron, Armezon, Sharpen, Outlook, Verdict, and Prowl H_2O in Irrigated Glyphosate-Resistant Corn

R. Currie and P. Geier

Summary

All treatments provided statistically superior control of Palmer amaranth compared to the control or a single application of glyphosate. All treatments provided excellent control of all other weed species. Although all herbicide tank mixes elevated corn yield compared to the control, there were no statistically significant differences among herbicides in their ability to do so.

Introduction

Bicyclopyrone is a newly labeled active ingredient in the herbicide tank mix Acuron (bicyclopyrone+mesotrione+S-metolachlor+atrazine+the herbicide safener benoxacor). Acuron is basically the long-used tank mix Lumax EZ (S-metolachlor+mesotrion e+atrazine+the herbicide safener benoxacor) with the addition of bicyclopyrone. The Syngenta Corporation is marketing this herbicide as an improvement on Lumax EZ, with broader weed spectrum and greater control consistency. The local price of this tank mix is unknown at the time. To allow producers to make informed purchases, comparisons need to be made to other standard tank mixes. It was not possible to test this new product directly with all competing products. Only a small subset of products was selected. Results should be compared to those of other products before purchasing.

Procedures

An experiment at the Kansas State University Southwest Research-Extension Center in Garden City, Kansas, evaluated weed control in irrigated corn with Acuron, Lumax EZ, Armezon (topramezone), Sharpen (saflufenacil), Outlook (dimethenamid-P), Verdict (dimethenamid-P+saflufenacil), and Prowl H_2O (pendimethalin) tank mixtures. The entire experimental area was overseeded with a mixture of shattercane (rox orange), green foxtail, and crabgrass seed. The kochia, Palmer amaranth, and Russian thistle populations were natural infestations. Glyphosate-resistant corn was planted May 7, 2014, and preemergence herbicides were applied on May 9, 2014, using a tractor-mounted, compressed CO_2 sprayer delivering 20 gpa at 4.1 mph and 30 psi. Postemergence herbicides were applied July 2, 2014, with a CO_2-pressurized backpack sprayer delivering 20 gpa at 3.0 mph and 27 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, arranged in a randomized complete block with four replications. Weed control was visually rated on August 21, 2014. This was 104 and 50 days after preemergence and postemergence treatments were applied, respectively. Corn yields were determined October 31, 2014, by mechanically harvesting the center two rows of each plot and adjusting grain moistures to 15.5%.

Results and Discussion

Weed pressure was very intense for Palmer amaranth, green foxtail, and crabgrass. Weed pressure for Russian thistle and shattercane was adequate. All treatments provided statistically superior control of Palmer amaranth, compared to the untreated or a single application of glyphosate. All treatments provided excellent control of all other weed species. Although all herbicide tank mixes elevated corn yield as compared to the control, there were no statistically significant differences among herbicides in their ability to do so. Because the weed control of all treatments was excellent, this study does not define the added value that bicyclopyrone adds to the various tank mixes. To understand how to best use this product, its price must be determined and further research is needed.

Table 1. Weed control with Lumax EZ, Atrazine, Acuron, Armezon, Sharpen, Outlook, Verdict, and Prowl H_2O in irrigated glyphosate-resistant corn.

				% Control						
				104 Days after planting						
Trt.	Herbicide[1]	Rate	Timing[2]	SASKR[3]	AMAPA[4]	KCHSC[5]	SETVI[6]	DIGSS[7]	SORVU[8]	Yield[9]
1	Lumax EZ	2.7 qt	A	99	99	100	100	97	100	138.6
	Atrazine	0.75 qt	A							
	Touchdown Total+AMS	28 oz	B							
2	Lumax EZ	1.5 qt	A	99	99	100	99	99	100	131.7
	Atrazine	0.5 qt	A							
	Halex GT	3.5 pt	B							
	Atrazine	0.5 qt	B							
	NIS	0.5%	B							
	AMS	2%	B							
3	Acuron	2.5 qt	A	100	100	100	99	96	100	113.2
	Atrazine	0.65 qt	A							
	Touchdown Total+AMS	28 oz	B							
4	Acuron	1.25 qt	A	100	99	100	99	96	100	132.6
	Atrazine	0.35 qt	A							
	Touchdown Total+AMS	28 oz	B							
	Acuron	1.25 qt	B							
	Atrazine	0.35 qt	B							
	COC	1%	B							
	AMS	2%	B							
5	Outlook	17.5 oz	A	100	99	100	100	95	100	115.8
	Atrazine	1 qt	A							
	Glyphosate+AMS	22 oz	B							

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										continued
6	Armezon	0.75 oz	A	100	93	96	100	93	100	139.8
	Roundup	22 oz	B							
	WeatherMax+AMS									
7	Outlook	17.5 oz	A	100	100	100	100	97	100	110.4
	Armezon	0.75 oz	A							
	Atrazine	1 qt	A							
	Roundup	22 oz	B							
	WeatherMax+AMS									
8	Prowl H_2O	1 qt	A	100	99	100	100	96	100	137.1
	Sharpen	2 oz	A							
	Atrazine	1 qt	A							
	Armezon	0.5 oz	B							
	Outlook	12 oz	B							
	Atrazine	0.5 qt	B							
	Roundup	22 oz	B							
	WeatherMax+AMS MSO	1%	B							
9	Verdict	10 oz	A	100	95	100	99	93	100	145.7
	Atrazine	1 qt	A							
	Armezon	0.5 oz	B							
	Outlook	12 oz	B							
	Atrazine	0.5 qt	B							
	Roundup	22 oz	B							
	WeatherMax+AMS MSO	1%	B							
10	Corvus	3.3 oz	A	99	96	100	98	96	100	136.7
	Atrazine	1 qt	A							
	Laudis	2 oz	B							
	Atrazine	0.5 qt	B							
	Roundup	22 oz	B							
	WeatherMax+AMS MSO	1%	B							
11	Zidua	2 oz	A	100	99	99	100	97	100	134.9
	Sharpen	2 oz	A							
	Atrazine	1 qt	A							
	Armezon	0.5 oz	B							
	Outlook	12 oz	B							
	Atrazine	0.5 qt	B							
	Roundup	22 oz	B							
	WeatherMax+AMS MSO	1%	B							
12	Balance Flexx	3 oz	A	100	98	100	99	94	100	136.8
	Atrazine	1 qt	A							
	Laudis	2 oz	B							
	Atrazine	0.5 qt	B							
	Roundup	22 oz	B							
	WeatherMax+AMS MSO	1%	B							

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										continued
13	Verdict	10 oz	A	100	95	100	100	91	100	139.8
	Atrazine	1 qt	A							
	Armezon	0.75 oz	B							
	Prowl H_2O	1 qt	B							
	Atrazine	0.5 qt	B							
	Roundup	22 oz	B							
	WeatherMax+AMS MSO	1%	B							
14	Resolve	1 oz	A	100	95	100	96	95	100	132.6
	Callisto (dry)	5 oz	A							
	Atrazine	1 qt	A							
	Roundup WeatherMax+AMS	22 oz	B							
15	Roundup WeatherMax+AMS	22 oz	B	98	75	100	100	85	100	140.1
16	Untreated control			0	0	0	0	0	0	64.7
	LSD@ 5%=			2.4	4.2	1.9	2.9	3.0	4.1	26.3

[1] AMS is ammonium sulfate at 2% w/v, NIS is nonionic surfactant, COC is crop oil concentrate, and MSO is methylated seed oil.
[2] A is preemergence, B is postemergence.
[3] Russian thistle.
[4] Palmer amaranth.
[5] Kochia.
[6] Green foxtail.
[7] Crabgrass.
[8] Shattercane.
[9] Bu/a.