Kansas Agricultural Experiment Station Research Reports

Volume 4
Issue 8 *Southwest Research-Extension Center Reports*

Article 20

2018

Efficacy of Mesotrione-Based Tank Mixtures and Application Timings Compared to Standards in Irrigated Corn

R. S. Currie
Kansas State University, rscurrie@ksu.edu

P. W. Geier
Kansas State University, pgeier@ksu.edu

Follow this and additional works at: https://newprairiepress.org/kaesrr

 Part of the Agronomy and Crop Sciences Commons, and the Weed Science Commons

Recommended Citation

Currie, R. S. and Geier, P. W. (2018) "Efficacy of Mesotrione-Based Tank Mixtures and Application Timings Compared to Standards in Irrigated Corn," *Kansas Agricultural Experiment Station Research Reports*: Vol. 4: Iss. 8. https://doi.org/10.4148/2378-5977.7640

This report is brought to you for free and open access by New Prairie Press. It has been accepted for inclusion in Kansas Agricultural Experiment Station Research Reports by an authorized administrator of New Prairie Press. Copyright 2018 the Author(s). Contents of this publication may be freely reproduced for educational purposes. All other rights reserved. Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned. K-State Research and Extension is an equal opportunity provider and employer.

K-STATE Research and Extension

2018 SWREC Agricultural Research

Efficacy of Mesotrione-Based Tank Mixtures and Application Timings Compared to Standards in Irrigated Corn

R.S. Currie and P. W. Geier

Summary

Kochia, Russian thistle, and quinoa control was excellent regardless of treatment or rating date. Sunflower control at 10 DAPT was very good when Anthem Maxx (pyroxasulfone + fluthiacet) + Solstice (fluthiacet + mesotrione) + atrazine and glyphosate were applied EPOST, while green foxtail control was 94% with the same treatment at 68 DAPT. Palmer amaranth and green foxtail control at 68 DAPT was 93 and 91%, respectively, when SureStart II (acetochlor + flumetsulam + clopyralid) + atrazine and glyphosate were applied PRE followed by glyphosate POST. All herbicide-treated corn yielded 34 to 69 bu/a more grain than the untreated control. Yields among herbicide-treated corn were lowest when no EPOST or POST application was included.

Introduction

Mesotrione has recently come off of patent and this has greatly reduced its price. This has allowed companies that previously did not have patent rights to include it to broaden the weed spectrum of their tank mixes. Many of these tank mixes, as well as other competitive chemistries have potent preemergence as well as postemergence activity so they may be applied prior to planting then reapplied after corn and escaped weeds have emerged. Therefore, it was the objective of this study to apply a broad array of these compounds at various timings to measure their relative weed control.

Experimental Procedures

An experiment at the Kansas State University Southwest Research-Extension Center near Garden City, KS, evaluated various herbicide premixes and tank mixtures for efficacy at various application timings. Naturally occurring weed populations were supplemented by overseeding the experimental area with quinoa, domesticated sunflower, and Rox Orange forage sorghum prior to corn planting. These species simulated common lambsquarters, common sunflower, and shattercane. Resicore (acetochlor + clopyralid + mesotrione), atrazine, glyphosate, and 2,4-D ester were applied 28 days early preplant (EPP). Preemergence (PRE) treatments included Anthem Maxx, atrazine, glyphosate, Solstice, Callisto (mesotrione), Balance Flexx (isoxaflutole), Keystone NXT (acetochlor + atrazine), Hornet WDG (flumetsulam + clopyralid), SureStart II, Acuron (*S*-metolachlor + atrazine +mesotrione + bicyclopyrone), and Resicore. Status (diflufenzopyr + dicamba) as well as many of the PRE herbicides were then reapplied as postemergence (POST) treatments. Application, environmental, crop, and weed information is given

in Table 1. Herbicides were applied using a tractor-mounted, compressed-CO_2 sprayer delivering 20 GPA at 30 psi. Plot size was 10 × 35 feet, and the experiment was a randomized complete block with four replications. Soil was a Beeler silt loam with pH 7.6 and 2.4% organic matter. Weed control ratings for all species were visually determined on June 19 and August 16, 2017, which was 10 and 68 days after the POST treatments (DAPT), respectively. Corn yields were determined October 18, 2017, by mechanically harvesting the two center rows of each plot and adjusting grain weights to 15.5% moisture.

Results and Discussion

Overall weed control was good with most herbicides, such that kochia, Russian thistle, and quinoa control was 98% or more regardless of treatment or rating date (data not shown). Sunflower control at 10 DAPT was 95% when Anthem Maxx + Solstice + atrazine and glyphosate were applied EPOST, while green foxtail control was 94% with the same treatment at 68 days after postemergence treatment (DAPT; Table 2). Palmer amaranth and green foxtail control at 68 DAPT was 93 and 91%, respectively, when SureStart II + atrazine and glyphosate were applied PRE followed by glyphosate POST. All herbicide-treated corn yielded 34 to 69 bu/a more grain than the untreated control. Yields among herbicide-treated corn plots were lowest when no EPOST or POST application was included.

Table 1. Application information

Application timing	Early preplant	Preemergence	Early postemergence	Postemergence
Application date	April 12, 2017	May 9, 2017	May 30, 2017	June 9, 2017
Air temperature (°F)	62	76	74	67
Relative humidity (%)	45	47	41	66
Soil temperature (°F)	52	46	72	67
Wind speed (mph)	10	3	5	7
Wind direction	South	Southeast	West	South
Soil moisture	Good	Good	Good	Good
Corn				
Height (inch)	---	---	4 to 7	7 to 10
Leaves (number)	0	0	2 to 3	4 to 5
Common sunflower				
Height (inch)	---	---	2 to 4	2 to 4
Density (plants/10 ft^2)	0	0	3	1
Palmer amaranth				
Height (inch)	---	---	1 to 3	2 to 4
Density (plants/10 ft^2)	0	0	1 to 5	1 to 5
Green foxtail				
Height (inch)	---	---	1 to 3	1 to 4
Density (plants/10 ft^2)	0	0	3	3
Kochia				
Height (inch)	---	---	4 to 8	2 to 4
Density (plants/10 ft^2)	0	0	3	1
Russian thistle				
Height (inch)	---	---	6 to 12	6 to 15
Density (plants/10 ft^2)	0	0	5	3
Quinoa				
Height (inch)	---	---	1 to 3	1 to 3
Density (plants/10 ft^2)	0	0	3	1

Table 2. Application timing and tank mixture evaluation in corn

			Sunflower		Palmer amaranth		Green foxtail		
Treatment[a]	Rate	Timing[b]	10 DA-D[c]	68 DA-D	10 DA-D	68 DA-D	10 DA-D	68 DA-D	Corn yield
	oz/a		% Visual						bu/a
Untreated	---		0	0	0	0	0	0	103.7
Anthem Maxx	4.0	PRE	100	100	100	100	100	99	172.6
Atrazine	32	PRE							
Glyphosate	22	PRE							
AMS	1%	PRE							
Solstice	2.5	POST							
Atrazine	16	POST							
Glyphosate	22	POST							
COC	1%	POST							
AMS	1%	POST							
Anthem Maxx	4.0	PRE	100	100	100	100	100	99	165.3
Callisto	4.0	PRE							
Atrazine	32	PRE							
Glyphosate	22	PRE							
AMS	1%	PRE							
Solstice	2.5	POST							
Atrazine	16	POST							
Glyphosate	22	POST							
COC	1%	POST							
AMS	1%	POST							
Anthem Maxx	4.0	PRE	100	100	100	100	100	98	161.9
Balance Flexx	3.0	PRE							
Atrazine	32	PRE							
Glyphosate	22	PRE							
AMS	1%	PRE							
Solstice	2.5	POST							
Atrazine	16	POST							
Glyphosate	22	POST							
COC	1%	POST							
AMS	1%	POST							
Anthem Maxx	4.0	PRE	100	100	100	99	100	100	166.1
Hornet WDG	4.0	PRE							
Atrazine	32	PRE							
Glyphosate	22	PRE							
AMS	1%	PRE							
Solstice	2.5	POST							
Atrazine	16	POST							
Glyphosate	22	POST							
COC	1%	POST							
AMS	1%	POST							

continued

Table 2. Application timing and tank mixture evaluation in corn

			Sunflower		Palmer amaranth		Green foxtail		
Treatment[a]	Rate	Timing[b]	10 DA-D[c]	68 DA-D	10 DA-D	68 DA-D	10 DA-D	68 DA-D	Corn yield
	oz/a		% Visual						bu/a
Anthem Maxx	2.0	EPOST	95	98	100	100	100	94	164.9
Solstice	2.5	EPOST							
Atrazine	32	EPOST							
Glyphosate	22	EPOST							
COC	1%	EPOST							
AMS	1%	EPOST							
Anthem Maxx	4.0	EPOST	100	100	100	100	100	98	151.0
Callisto	3.0	EPOST							
Atrazine	32	EPOST							
Glyphosate	22	EPOST							
COC	1%	EPOST							
AMS	1%	EPOST							
Acuron	1.25 qt	PRE	100	100	100	99	100	100	169.9
Atrazine	10	PRE							
Glyphosate	22	PRE							
AMS	1%	PRE							
Acuron	1.25 qt	POST							
Atrazine	10	POST							
Status	2.5	POST							
Glyphosate	28	POST							
AMS	1%	POST							
Acuron	2.5 qt	PRE	100	100	100	100	100	97	138.0
Atrazine	13	PRE							
Glyphosate	22	PRE							
AMS	1%	PRE							
Resicore	2.5 qt	EPP	100	100	100	98	98	96	161.3
Atrazine	32	EPP							
Glyphosate	32	EPP							
2,4-D ester	16	EPP							
AMS	2.5%	EPP							
Glyphosate	32	POST							
AMS	2.5%	POST							
Keystone NXT	2.1 qt	PRE	100	100	100	98	100	96	164.3
Hornet WDG	4.0	PRE							
Glyphosate	32	PRE							
AMS	2.5%	PRE							
Glyphosate	32	POST							
AMS	2.5%	POST							

continued

Table 2. Application timing and tank mixture evaluation in corn

			Sunflower		Palmer amaranth		Green foxtail		
Treatment[a]	Rate	Timing[b]	10 DA-D[c]	68 DA-D	10 DA-D	68 DA-D	10 DA-D	68 DA-D	Corn yield
	oz/a		% Visual						bu/a
SureStart II	2.0 pt	PRE	100	100	100	93	100	91	160.5
Atrazine	32	PRE							
Glyphosate	32	PRE							
AMS	2.5%	PRE							
Glyphosate	32	POST							
AMS	2.5%	POST							
Resicore	2.5 qt	PRE	100	100	100	100	100	97	167.1
Atrazine	32	PRE							
Glyphosate	32	PRE							
AMS	2.5%	PRE							
Glyphosate	32	POST							
AMS	2.5%	POST							
Resicore	1.25 qt	PRE	100	100	100	100	100	97	171.6
Atrazine	32	PRE							
Glyphosate	32	PRE							
AMS	2.5%	PRE							
Resicore	1.25 qt	POST							
Atrazine	32	POST							
Glyphosate	32	POST							
AMS	2.5%	POST							
LSD (0.05)			4	2	1	4	2	4	31.7

[a]AMS = ammonium sulfate. COC = crop oil concentrate.
[b]EPP = 28 days before planting, PRE = preemergence, EPOST = early postemergence, and POST = postemergence.
[c]DA-D = days after postemergence treatment. Weed control was determined on June 19 and August 16, 2017, whereas corn yields were determined on October 18, 2017.

Figure 1. Untreated control.

Figure 2. Anthem Maxx 4 oz/a + atrazine 32 oz/a + glyphosate 22 oz/a and ammonium sulfate 1% applied preemergence followed by Solstice 2.5 oz/a + atrazine 16 oz/a + glyphosate 22 oz/a + crop oil concentrate 1% and ammonium sulfate 1% applied postemergence, 14 days after postemergence application.

Figure 3. Anthem Maxx 2 oz/a + Solstice 2.5 oz/a + atrazine 32 oz/a + glyphosate 22 oz/a + crop oil concentrate 1% and ammonium sulfate 1% applied early postemergence, 24 days after early postemergence application.

Figure 4. Acuron 1.25 qt/a + atrazine 10 oz/a + glyphosate 22 oz/a and ammonium sulfate 1% applied preemergence followed by Acuron 1.25 qt/a + atrazine 10 oz/a + Status 2.5 oz/a + glyphosate 22 oz/a and ammonium sulfate 1% applied postemergence, 14 days after postemergence application.

Figure 5. Resicore 1.25 qt/a + atrazine 32 oz/a + glyphosate 32 oz/a and ammonium sulfate 2.5% applied preemergence followed by Resicore 1.25 qt/a + atrazine 32 oz/a + glyphosate 32 oz/a and ammonium sulfate 2.5% applied postemergence, 14 days after postemergence application.