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Maverick Rates and Application Timings for Weed Control in Kansas Corn

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Patrick W. Geier and Sarah H. Lancaster

Summary

Maverick herbicide was evaluated as a preemergence (PRE) treatment at Manhattan, and as a PRE and postemergence (POST) treatment at Garden City. Early in the season, Maverick applied preemergence (PRE) was as effective as Bicep II Magnum, Harness Xtra, Verdict, Resicore, or Acuron for kochia, Palmer amaranth, and green foxtail control at Garden City. Maverick PRE also controlled Russian thistle 95% early. Later in the season, Maverick or Kyro postemergence (POST) provided at least 95% kochia control, 98% Palmer amaranth control, and complete Russian thistle and green foxtail control. At the Manhattan location, Maverick was as effective on Palmer amaranth as the competitive standards. Control of entireleaf morningglory and common sunflower were more variable, but Maverick controlled these species as well as the competitive standards. Herbicide treatment at Garden City increased grain yields 57% to 81% relative to the weedy controls.

Introduction

Herbicide combinations that contain multiple modes of action are necessary to control diverse weed populations and mitigate herbicide resistance. Maverick Corn Herbicide is a combination of mesotrione, clopyralid, and pyroxasulfone that was first available for weed control in corn during 2023. The objective of the study was to compare weed control and corn yield with Maverick rates and tank mixtures to industry standards.

Experimental Procedures

At Manhattan, herbicides were applied at planting using a compressed-CO₂ backpack sprayer delivering 15 gpa at 32 psi and 3.0 mph. At the Garden City experiment, Maverick was applied PRE and/or POST using a tractor-mounted, compressed-CO₂ sprayer delivering 19.4 gpa at 30 psi and 4.1 mph. Application, environmental, and plant information is shown in Table 1. Plots were 10 by 30 or 35 feet, and arranged in a randomized complete block design replicated four times. Soil at both locations was a silt loam. Weed control at Manhattan was visually rated on May 8, May 16, May 22, May 30, and June 13, 2024. These dates were 14, 22, 28, 36, and 50 days after the PRE treatments, respectively. Visual weed control was determined on June 6 and July 3, 2024, at Garden City. These dates were 1 day and 28 days after the POST treatments (DAB), respectively. Corn yields at Garden City were determined on October 18, 2024, by mechanically harvesting the center two rows of each plot and correcting grain moistures to 15.5%. Yield data were not collected at Manhattan.

Results and Discussion

At Garden City, PRE control of kochia was 95% or more with all treatments of Maverick, Harness Xtra 5.6, Resicore, and Acuron at 1 DAB (Table 2). Only Bicep II Magnum and Verdict applied PRE provided less than 90% kochia control. By 28 DAB, kochia control was 95% with all herbicides except Bicep II Magnum PRE followed by Halex GT POST. Russian thistle control at 1 DAB was slightly less with Verdict or Maverick alone applied PRE. However, all herbicides controlled Russian thistle completely by 28 DAB. While minor differences between herbicides occurred for Palmer amaranth control at 1 DAB, no herbicide provided less than 93% control. At 28 DAB, all herbicides except Bicep II Magnum followed by Halex GT controlled Palmer amaranth 98% to 100%. Acuron was the only herbicide to control green foxtail less than 100% at 1 DAB (Table 3), but foxtail control was complete regardless of herbicide by 28 DAB. Control of Palmer amaranth, entireleaf morningglory, and common sunflower at Manhattan did not differ between herbicide treatments at 14, 22, 28, or 36 DAA (data not shown). Maverick was slightly more effective for Palmer amaranth control than Bicep II Magnum at 50 DAA (Table 4) and similar to Acuron, Resicore, Trivolt, or Storen PRE. Entireleaf morningglory control at Manhattan ranged from 70% to 93% at Manhattan late in the season, but did not differ between herbicides. Similarly, common sunflower control was 87% to 99% at Manhattan by 50 DAA but no differences occurred between herbicides.

Slight (6% to 11%) corn necrosis was observed with all POST treatments at Garden City at 7 DAB (data not shown). Injury did not persist past 14 DAB, and no injury was observed with the PRE treatments at Manhattan. Grain yields at Garden City ranged from 109 to 123 bu/a for herbicide-treated corn, and did not differ between any treatments (Table 3). However, all herbicide-treated corn yielded 39 to 56 bu/a more grain than the untreated corn.

Acknowledgments

Funding for this research was provided by Valent U. S. A.

Table 1. Application, environmental, and plant information for the Maverick corn trials

Location:	Garden City		Manhattan
Application timing	Preemergence	Postemergence	Preemergence
Application date	April 24, 2024	June 6, 2024	April 24, 2024
Air temperature (F)	50	67	58
Relative humidity (%)	38	78	50
Soil temperature (F)	52	64	57
Wind speed (mph)	3 to 6	4 to 7	1 to 2
Wind direction	East-northeast	South-southeast	Southeast
Soil moisture	Fair	Good	Good
Corn			
Height (inches)	---	8 to 13	---
Leaves (no.)	0	4 to 5	0
Kochia			
Height (inches)	---	1 to 4	---
Density (plants/ft ²)	0	0.2	0
Palmer amaranth			
Height (inches)	---	2 to 4	---
Density (plants/ft ²)	0	0.1	0
Russian thistle			
Height (inches)	---	1 to 3	---
Density (plants/ft ²)	0	0.1	0
Green foxtail			
Height (inches)	---	1 to 2	---
Density (plants/ft ²)	0	0.1	0
Entireleaf morningglory			
Height (inches)	---	---	---
Density (plants/ft ²)	0	0	0
Common sunflower			
Height (inches)	---	---	---
Density (plants/ft ²)	0	0	0

Table 2. Broadleaf weed control with Maverick in corn at Garden City

Treatment ¹	Rate	Timing ²	Kochia		Russian thistle		Palmer amaranth	
			1 DAB ³	28 DAB	1 DAB	28 DAB	1 DAB	28 DAB
	oz/a		----- % visual -----					
Bicep II Magnum	57	PRE	83	88	100	100	93	93
Halex GT	57	POST						
NIS	0.25%	POST						
AMS	3.0 lb	POST						
Bicep II Magnum	57	PRE	80	95	100	100	94	99
Maverick	14	POST						
Glyphosate	27	POST						
NIS	0.25%	POST						
AMS	3.0 lb	POST						
Harness Xtra 5.6	64	PRE	100	100	100	100	100	100
Kyro	45	POST						
Glyphosate	27	POST						
NIS	0.25%	POST						
AMS	3.0 lb	POST						
Harness Xtra 5.6	64	PRE	98	100	100	100	99	100
Maverick	14	POST						
Glyphosate	27	POST						
NIS	0.25%	POST						
AMS	3.0 lb	POST						
Verdict	12	PRE	85	98	90	100	95	98
Armezon Pro	14	POST						
Glyphosate	27	POST						
NIS	0.25%	POST						
AMS	3.0 lb	POST						
Verdict	12	PRE	86	98	90	100	93	100
Maverick	14	POST						
Glyphosate	27	POST						
NIS	0.25%	POST						
AMS	3.0 lb	POST						
Resicore	45	PRE	99	99	99	100	98	100
Resicore	45	POST						
Glyphosate	27	POST						
NIS	0.25%	POST						
AMS	3.0 lb	POST						
Acuron	48	PRE	96	99	98	100	95	99
Acuron	48	POST						
Glyphosate	27	POST						
NIS	0.25%	POST						
AMS	3.0 lb	POST						

continued

Table 2. Broadleaf weed control with Maverick in corn at Garden City

Treatment ¹	Rate	Timing ²	Kochia		Russian thistle		Palmer amaranth	
			1 DAB ³	28 DAB	1 DAB	28 DAB	1 DAB	28 DAB
	oz/a		----- % visual -----					
Maverick	18	PRE	95	98	95	100	100	98
Maverick	14	POST						
Glyphosate	27	POST						
NIS	0.25%	POST						
AMS	3.0 lb	POST						
Maverick	18	PRE	100	100	100	100	99	100
Atrazine	32	PRE						
Maverick	14	POST						
Atrazine	32	POST						
Glyphosate	27	POST						
NIS	0.25%	POST						
AMS	3.0 lb	POST						
Maverick	24	PRE	100	100	100	100	100	100
Atrazine	32	PRE						
Status	5.0	POST						
Atrazine	32	POST						
Glyphosate	27	POST						
NIS	0.25%	POST						
AMS	3.0 lb	POST						
LSD (0.05)			5	5	4	NSD	6	5

¹ NIS is nonionic surfactant, AMS is ammonium sulfate.

² PRE is preemergence, POST is postemergence.

³ DAB is days after the postemergence treatments.

Table 3. Green foxtail control and grain yield with Maverick in corn at Garden City

Treatment ¹	Rate	Timing ²	Green foxtail		Corn yield
			1 DAB ³	28 DAB	
	oz/a		----- % visual -----		bu/a
Untreated control	---	---	---	---	69.3
Bicep II Magnum	57	PRE	100	100	110.7
Halex GT	57	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Bicep II Magnum	57	PRE	100	100	109.3
Maverick	14	POST			
Glyphosate	27	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Harness Xtra 5.6	64	PRE	100	100	113.1
Kyro	45	POST			
Glyphosate	27	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Harness Xtra 5.6	64	PRE	100	100	125.2
Maverick	14	POST			
Glyphosate	27	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Verdict	12	PRE	100	100	122.8
Armezon Pro	14	POST			
Glyphosate	27	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Verdict	12	PRE	100	100	120.8
Maverick	14	POST			
Glyphosate	27	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Resicore	45	PRE	100	100	112.9
Resicore	45	POST			
Glyphosate	27	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Acuron	48	PRE	96	100	120.0
Acuron	48	POST			
Glyphosate	27	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			

continued

Table 3. Green foxtail control and grain yield with Maverick in corn at Garden City

Treatment ¹	Rate	Timing ²	Green foxtail		Corn yield
			1 DAB ³	28 DAB	
	oz/a		----- % visual -----		bu/a
Maverick	18	PRE	100	100	117.9
Maverick	14	POST			
Glyphosate	27	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Maverick	18	PRE	100	100	118.3
Atrazine	32	PRE			
Maverick	14	POST			
Atrazine	32	POST			
Glyphosate	27	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Maverick	24	PRE	100	100	108.8
Atrazine	32	PRE			
Status	5.0	POST			
Atrazine	32	POST			
Glyphosate	27	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
LSD (0.05)			3	NSD	25.6

¹ NIS is nonionic surfactant, AMS is ammonium sulfate.

² PRE is preemergence, POST is postemergence.

³ DAB is days after the postemergence treatments.

Table 4. Weed control at the Maverick corn trial in Manhattan

Treatment ¹	Rate	Timing ²	Palmer amaranth	Entireleaf morningglory	Common sunflower
			50 DAA ³	50 DAA	50 DAA
	oz/a		----- % visual -----		
Acuron	96	PRE	98	82	99
Glyphosate	20	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Bicep II Magnum	67	PRE	96	70	87
Glyphosate	20	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Resicore	88	PRE	98	72	93
Glyphosate	20	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Maverick	24	PRE	99	80	93
Glyphosate	20	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Maverick	24	PRE	99	84	97
Atrazine	24	PRE			
Glyphosate	20	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Maverick	32	PRE	99	86	92
Glyphosate	20	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Maverick	32	PRE	99	87	99
Atrazine	32	PRE			
Glyphosate	20	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Trivolt	20	PRE	99	91	99
Glyphosate	20	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
Storen	77	PRE	99	93	99
Glyphosate	20	POST			
NIS	0.25%	POST			
AMS	3.0 lb	POST			
LSD (0.05)			3	NSD	NSD

¹ NIS is nonionic surfactant, AMS is ammonium sulfate.² PRE is preemergence, POST is postemergence.³ DAA is days after the preemergence treatments.