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Summary

No herbicide treatment provided more than 50% kochia control at Garden City, KS, or 80% kochia control at Hays the first week of application. At Garden City, KS, treatments of Vida (pyraflufen) plus glyphosate and 2,4-D or dicamba, glyphosate alone, or glyphosate plus 2,4-D or dicamba provided greater than 89% kochia control. At Hays, glyphosate alone or with 2,4-D, and Vida plus dicamba alone or with glyphosate had greater than 85% control of kochia.

Introduction

Vida is a protoporphyrinogen oxidase (PPO) inhibitor (Group 14) herbicide that includes compounds such as Cobra (lactofen), Flexstar (fomesafen), and Ultra Blazer (acifluorfen). This class of herbicides causes cell membranes to burst leading to rapid tissue death. Cell rupture happens so quickly that very little translocation to root or meristematic tissues occur. This can dramatically reduce the ability of this class of herbicides to kill weeds. Therefore, it was the objective of this study to tank mix Vida with herbicides that translocate better such as glyphosate, 2,4-D, and dicamba.

Experimental Procedures

Two experiments were conducted in western Kansas to evaluate Vida alone and in tank mixtures for early spring kochia control in fallow. Locations included the Kansas State University Agricultural Research Center near Hays, KS, and the Southwest Research-Extension Center near Garden City, KS. Application, environmental, and weed information are given in Table 1. Herbicides were applied using a tractor-mounted sprayer delivering 20 GPA at 30 psi at Garden City or a backpack sprayer at Hays delivering 15 GPA at 32 psi. Soil at Hays was a Roxbury silt loam with 2.7% organic matter and pH 7.9. Garden City soil was a Ulysses silt loam with 3.4% organic matter and pH 7.9. Plots were 10 × 32 feet (Hays) or 10 × 35 feet (Garden City) and arranged in randomized complete blocks with four replications. Visual kochia control was determined on May 17, June 2, and June 16, 2017, at Garden City; dates were 5, 21, and 35 days after treatment (DAT), respectively. At Hays, visual kochia control was determined on June 9, June 23, and July 7, 2017; dates were 7, 21, and 35 DAT, respectively.

Results and Discussion

By 7 DAT, no herbicide treatment provided more than 50% kochia control at Garden City or 80% kochia control at Hays (Table 2). At Garden City, treatments of Vida

plus glyphosate and 2,4-D or dicamba, glyphosate alone, or glyphosate plus 2,4-D or dicamba provided the best kochia control at 21 and 35 DAT (89 to 97%). Glyphosate alone or with 2,4-D, and Vida plus dicamba alone or with glyphosate controlled kochia 85 to 91% at Hays by 21 DAT, and only Vida plus dicamba with or without glyphosate controlled kochia more than 80% by 35 DAT.

Table 1. Application and weed information

Location	Garden City, KS	Hays, KS
Application date	May 12, 2017	June 2, 2017
Air temperature (°F)	64	71
Relative humidity (%)	43	72
Soil temperature (°F)	55	70
Wind speed (mph)	5	5
Wind direction	North	South
Soil moisture	Good	Excellent
Kochia:		
Height (inch)	2 to 8	1 to 9
Density (plants/ft ²)	9.3	56

Table 2. Vida alone and in tank mixtures for spring kochia control in fallow at two Kansas locations

Treatment ^a	Rate	Garden City			Hays		
		5 DAT ^b	21 DAT	35 DAT	7 DAT ^b	21 DAT	35 DAT
	oz/a	----- % Visual -----					
Untreated	---	0	0	0	0	0	0
Vida	2.0	33	53	45	70	60	40
COC	1.0%						
AMS	2.0%						
Vida	2.0	33	94	83	63	73	48
Glyphosate	22						
AMS	2%						
Vida	2.0	48	58	50	63	55	23
2,4-D amine	4.0						
COC	1.0%						
AMS	2.0%						
Vida	2.0	45	96	89	55	58	45
Glyphosate	22						
2,4-D amine	4.0						
AMS	2%						
Glyphosate	22	19	97	90	48	85	68
AMS	2.0%						
Glyphosate	22	25	97	90	55	88	73
2,4-D amine	4.0						
AMS	2.0%						
2,4-D amine	4.0	--- ^c	---	---	3	0	0
AMS	2.0%						
Vida	2.0	50	91	93	80	90	83
Dicamba	4.0						
COC	1.0%						
AMS	2.0%						
Vida	2.0	48	96	97	73	91	83
Glyphosate	22						
Dicamba	4.0						
AMS	2.0%						
Dicamba	4.0	21	55	70	50	70	73
AMS	2.0%						
Dicamba	4.0	38	97	97	--- ^c	---	---
Glyphosate	22						
AMS	2.0%						
LSD (0.05)		7	6	8	8	8	8

^aAMS = ammonium sulfate. COC = crop oil concentrate.^bDAT = days after treatment. Dates for weed control determination were May 17, June 2, and June 16, 2017 at Garden City, and June 9, June 23, and July 7, 2017 at Hays.^c--- = treatment not included at that location.



Figure 1. Untreated control at Garden City, KS.



Figure 2. Vida 2.0 oz/a plus crop oil concentrate 1% and ammonium sulfate 2%, 34 days after treatment at Garden City, KS.



Figure 3. Vida 2.0 oz/a plus glyphosate 22 oz/a and ammonium sulfate 2%, 34 days after treatment at Garden City, KS.



Figure 4. Glyphosate 22 oz/a plus ammonium sulfate 2%, 34 days after treatment at Garden City, KS.



Figure 5. Dicamba 4.0 oz/a plus ammonium sulfate 2%, 34 days after treatment at Garden City, KS.



Figure 6. Dicamba 4.0 oz/a plus glyphosate 22 oz/a and ammonium sulfate 2%, 34 days after treatment at Garden City, KS.