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Leafy spurge control with chlorflurenol tank-mixes

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Abstract:

Experiments were conducted to assess the effects of tank-mixing chlorflurenol with picloram, dicamba, sulfometuron, and fluroxypyr for leafy spurge control. Control with picloram, dicamba, and sulfometuron at 0.25, 1.0, and 0.09 lb ai/A, respectively, and both fluroxypyr rates did not differ with or without chlorflurenol additions the year of application. Leafy spurge control was greater during the year of application when picloram and dicamba, at 0.5 and 2.0 lb ai/A, respectively, were tank-mixed with chlorflurenol . The year following application, control with picloram, sulfometuron, and fluroxypyr at 0.5, 0.09, and 0.25 lb ai/A, respectively did not differ with or without chlorflurenol additions. Also, dicamba at 1.0 lb ai/A did not differ with or without the addition of 0.125 lb ai/A of chlorflurenol. When this treatment was mixed with 0.07 lb ai/A of chlorflurenol, leafy spurge control improved. Leafy spurge control was improved with both chlorflurenol rates when mixed with picloram, dicamba, and fluroxypyr at 0.25, 2.0, and 0.125 lb ai/A, respectively, when compared to these compounds sprayed by themselves.

Introduction

Chlorflurenol is a morphactin possessing growth regulator properties. Depending on dose and plant species, the compound can stimulate or inhibit growth and development. CF125 and Maintain CF125 are commercial products that have been used to retard herbaceous and woody plant growth. Curbiset induces cucumbers to set large numbers of parthenocarpic fruits and Multiprop induces additional vegetative growth of pineapple slips.

In 1973, Ilays (1973) observed that foliar applications of chlorflurenol to cauliflower caused numerous shoots to develop from roots. Baradari, *et al*. (1980), conducted Canada thistle experiments with ^{14}C-chlorflurenol, ^{14}C-dicamba tank-mixed with chlorflurenol,

and field studies with chlorflurenol + dicamba tank-mixes. Studies with labeled chlorflurenol indicated that the compound showed strong acropetal movement and weak basipetal movement in Canada thistle. Labeled dicamba mixed with chlorflurenol displayed twice the absorption, lowered acropetal movement, produced a ten-fold increase in root label, and four-fold increase in label exuded from roots compared to dicamba applied alone. In field studies, no differences occurred between dicamba applied alone compared to tank-mixes with chlorflurenol. However, these researchers indicated that more consistent control was observed when dicamba was applied with chlorflurenol at 0.5 + 0.5 lb ai/A compared to dicamba alone at the same rate. Non-published research conducted at Colorado State University indicated that a split application of clopyralid + chlorflurenol (0.25 + 0.25 lb ai/A) in spring followed by dicamba, + chlorflurenol (0.25 + 0.25 lb ai/A) in fall provided 97% Canada thistle control in July of the year following application. Clopyralid (0.25 lb ai/A) and dicamba (0.25 lb ai/A) applied in spring provided 24 and 0% control, respectively, the year following application. No split applications of clopyralid in spring and dicamba in fall without chlorflurenol were made.

Materials and methods

A field study was established in 1988 near Meeker, CO to assess the effects of tank-mixing chlorflurenol with several different herbicides for leafy spurge control. The experiment was designed as a randomized complete block with four replications. Picloram (0.25 and 0.5 lb ai/A), dicamba (1.0 and 2.0 lb ai/A), sulfometuron (0.09 lb ai/A), and fluroxypyr (0.125 and 0.25 lb ai/A) were applied with and without chlorflurenol at 0.07 and 0.125 lb ai/A. Additionally; chlorflurenol was applied alone at 0.07 and 0.125 lb ai/A. All treatments were applied using a $C0_2$ pressurized backpack sprayer calibrated to deliver 24 GPA at 15 psi through 1103LP flat fan nozzles. All herbicides except fluroxypyr were applied on June 10, 1988 when leafy spurge was flowering. Fluroxypyr was applied on August 2, 1988 during leafy spurge seed set. Other application data and information are presented in Table 1. Visual evaluations comparing control in treated plots to non-sprayed check plots were taken on August 2, August 30, September 28, 1988 and on July 5, 1989.

Table 1. Application information for leafy spurge control with chlorflurenol tank-mixes.

Environmental data			
Application date		June 30, 1988	Aug 2, 1988
Application time		2:00 pm	6:00 pm
Air temperature, C		28	30
Cloud cover, %		0	80
Relative humidity, %		18	58
Wind speed/direction, mph		0 to 2/SE	0 to 2/SE
Soil temperature (2 in), C		18	24
Weed data			
Application date	Species	Growth Stage	Density (plt/ft^2)
Jun 30, 1988	EPHES	flowering	3 to 10
Aug 2, 1988	EPHES	seed set	3 to 10

Results and discussion

Leafy spurge control with picloram, dicamba, and sulfometuron at 0.25, 1.0, and 0.09 lb ai/A, respectively, and both fluroxypyr rates did not differ with or without chlorflurenol additions the year of application (Table 2). However, there was a tendency for greater control with these treatments by tank-mixing with chlorflurenol. Leafy spurge control was greater during the year of application when picloram and dicamba, at 0.5 and

Table 2. Leafy spurge control with chlorflurenol tank-mixes.

Herbicide	Rate	Timing	Leafy spurge control			
	(lb ai/A)		8-2-88	8-3-88	9-28-88	7-5-89
			(% of Check)			
picloram	0.25	flower	23	26	30	29
picloram	0.5	flower	31	34	30	70
dicamba	1.0	flower	15	11	14	4
dicamba	2.0	flower	4	5	5	20
chlorflurenol	0.07	flower	19	15	15	20
chlorflurenol	0.125	flower	6	4	9	0
sulfometuron	0.09	flower	21	25	20	15
fluroxypyr	0.125	seed set	0	61	63	8
fluroxypyr	0.25	seed set	0	79	86	54
chlorflurenol	0.07					
+ picloram	0.25	flower	20	46	50	61
chlorflurenol	0.07					
+ picloram	0.5	flower	51	58	60	75
chlorflurenol	0.125					
+ picloram	0.25	flower	26	33	44	69
chlorflurenol	0.125					
+ picloram	0.5	flower	60	69	76	78
chlorflurenol	0.07					
+ dicamba	1.0	flower	29	28	33	44
chlorflurenol	0.07					
+ dicamba	2.0	flower	46	51	58	45
chlorflurenol	0.125					
+ dicamba	1.0	flower	19	20	26	16
chlorflurenol	0.125					
+ dicamba	2.0	flower	60	70	68	60
chlorflurenol	0.07					
+ sulfometuron	0.09	flower	13	15	19	16
chlorflurenol	0.125					
+ sulfometuron	0.09	flower	13	21	25	23
chlorflurenol	0.07					
+ fluroxypyr	0.125	seed set	0	71	75	48
chlorflurenol	0.07					
+ fluroxypyr	0.25	seed set	0	92	95	54
chlorflurenol	0.125					
+ fluroxypyr	0.125	seed set	0	76	82	43
chlorflurenol	0.125					
+ fluroxypyr	0.25	seed set	0	92	95	70
check			0	0	0	0
LSD (0.05)			17	21	25	20

2.0 lb ai/A, respectively, were tank-mixed with chlorflurenol. On the September 28 evaluation, leafy spurge control with picloram at 0.5 lb ai/A was increased by 30 and 46% when mixed with chlorflurenol at 0.07 and 0.125 lb ai/A, respectively. Control was increased with dicamba at 2.0 lb ai/A by 53 and 63% when mixed with chlorflurenol at 0.07 and 0.125 lb ai/A, respectively.

Data was somewhat different the year following application. Leafy spurge control with picloram, sulfometuron, and fluroxypyr at 0.5, 0.09, and 0.25 lb ai/A, respectively, did not differ with or without chlorflurenol additions (Table 2). Also, dicamba at 1.0 lb ai/A did not differ with or without the addition of 0.125 lb ai/A of chlorflurenol; however, when this treatment was mixed with 0.07 lb ai/A of chlorflurenol, leafy spurge control was improved by 40%. Leafy spurge control was improved with both chlorflurenol rates by 32, 40, 25, 40, 40, and 35% when mixed with picloram, dicamba, and fluroxypyr at 0.25, 2.0, and 0.125 lb ai/A, respectively, when compared to these compounds sprayed by themselves.

Chlorflurenol additions promote better leafy spurge control with picloram, dicamba, and fluroxypyr, depending upon morphactin and herbicide rate compared to these compounds applied alone. Leafy spurge control with sulfometuron was poor and never showed increased control when tank-mixed with chlorflurenol. Chlorflurenol tank-mixes with picloram, dicamba, and fluroxypyr warrant further investigation. If a lower amount of herbicide can be used to gain the same or better leafy spurge control, economic and environmental advantages could be realized.

Literature cited

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