

Flax Response to Application Timing of Postemergence Herbicides

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The trial was conducted to evaluate flax response to three application timings of selected POST herbicides.

The experimental design was a randomized complete block design with a split-plot arrangement (main plots=herbicide application timing and subplots=herbicide treatments) and three replicates. The trial was conducted on a conventional-tilled, loam soil with 7.6 pH and 2.4% organic matter at Carrington, ND in 2001. 'Pembina' flax was seeded on May 11 at the rate of 42 lb/A. Herbicide treatments were applied to the center 6.7 ft of 10- by 25-ft plots with a CO₂ pressurized hand-held plot sprayer at 17 gal/A and 35 psi through 80015 flat fan nozzles. Early POST (POSTA) treatments were applied on June 2 with 62 F, 64% RH, 70% clear sky, and 7 mph wind to 1.5-inch tall flax. Mid POST (POSTB) treatments were applied on June 17 with 53 F, 95% RH, 30% clear sky, and 7 mph wind to 5- to 6-inch tall flax, 2- to 4-leaf yellow and green foxtail, 2- to 3-inch tall redroot and prostrate pigweed, 3- to 5-inch tall common lambsquarters, and 3- to 6-inch tall wild mustard. Late POST (POSTC) treatments were applied on June 28 with 77 F, 86% RH, 10% clear sky, and 5 mph wind to 12- to 14-inch tall (initial flowering stage) flax. The trial was harvested on August 23 with a plot combine.

Full-season weed control was achieved with bromoxynil&MCPA or clopyralid&MCPA and sethoxydim tank mixtures, or the three-way tank mixture (Table 1). Averaged across herbicide treatments, flax growth reduction was higher with the first two herbicide application times but PM (physiological maturity) was delayed and seed yield was reduced with the late application (Table 2). Herbicide treatments that included clopyralid&MCPA generally had significant flax growth reduction (Table 3). All herbicide treatments and application timings extended PM four to nine days compared to the untreated check. All herbicide treatments applied early improved yield compared to the untreated check (Table 4). The mid- and late-applied herbicide treatments generally had similar yield as the untreated check. The highest test weight with all herbicide application timings was with bromoxynil&MCPA or clopyralid&MCPA and sethoxydim tank mixtures, or the three-way tank mixture. Based on these data, bromoxynil&MCPA or clopyralid&MCPA and sethoxydim tank mixtures, or the three-way tank mixture applied early provided the highest yield and test weight.

Table 1. Weed control in flax with three application timings of POST herbicides.

Treatment ^c	Herbicide	Rate	Herbicide application timing ^a					
			POSTA		POSTB		POSTC	
			Weed control ^b					
			6/29		7/17		7/25	
		Grass	Broadleaf	Grass	Broadleaf	Grass	Broadleaf	
		lb/A	%					
Bromoxynil&MCPA		0.23&0.23	0	95	0	94	0	94
Clopyralid&MCPA		0.07&0.39	0	93	0	90	0	88
Bromoxynil&MCPA+clopyralid&MCPA		0.23&0.23+0.07&0.39	0	98	0	96	0	96
Bromoxynil&MCPA+sethoxydim+MSO		0.23&0.23+0.2+2pt	92	96	81	81	87	94
Clopyralid&MCPA+sethoxydim+MSO		0.07&0.39+0.2+2pt	92	95	94	86	91	95
Bromoxynil&MCPA+clopyralid&MCPA+sethoxydim+MSO		0.23&0.23+0.07&0.39+0.2+2pt	92	97	91	96	87	96
Bentazon&sethoxydim+MSO		1+0.2+2pt	93	94	95	50	87	55
Untreated check			0	0	0	0	0	0
LSD (0.05)			4	9	4	9	4	9

^aPOSTA=June 2; POSTB=June 17; POSTC=June 28.

^bGrass=Yellow and green foxtail; Broadleaf=Common lambsquarters, redroot and prostrate pigweed, wild buckwheat, and wild mustard.

^cBromoxynil&MCPA=Bronate; Clopyralid&MCPA=Curtail M; Bentazon&sethoxydim=Rezult; MSO=Destiny, a methylated seed oil from Agrilience, St. Paul, MN.

Table 2. Flax response across herbicide treatments with three application timings of POST herbicides.

Herbicide application timings ^a	Flax			
	Injury ^b	PM ^c	Seed yield	Test weight
	%	days	bu/A	lb/bu
POSTA	13	88	18.7	52.9
POSTB	17	88	17.1	52.6
POSTC	7	91	14.2	53.1
LSD (0.05)	6	1	3	NS

^aPOSTA=June 2; POSTB=June 17; POSTC=June 28.

^bInjury=% growth reduction by visual evaluation 7 days after treatment.

^cPM=Physiological maturity from seeding date.

Table 3. Flax injury and days to physiological maturity with three application timings of POST herbicides.

Treatment ^b	Herbicide	Rate	Herbicide application timing ^a					
			POSTA		POSTB		POSTC	
			Flax					
			Injury ^c	PM ^d	Injury	PM	Injury	PM
		lb/A	%	days	%	days	%	days
Bromoxynil&MCPA		0.23&0.23	0	88	8	88	0	90
Clopyralid&MCPA		0.07&0.39	3	89	23	88	12	91
Bromoxynil&MCPA+clopyralid&MCPA		0.23&0.23+0.07&0.39	23	90	40	90	13	93
Bromoxynil&MCPA+sethoxydim+MSO		0.23&0.23+0.2+2pt	18	88	3	88	3	92
Clopyralid&MCPA+sethoxydim+MSO		0.07&0.39+0.2+2pt	11	88	23	90	15	92
Bromoxynil&MCPA+clopyralid&MCPA+sethoxydim+MSO		0.23&0.23+0.07&0.39+0.2+2pt	37	90	32	90	15	93
Bentazon&sethoxydim+MSO		1+0.2+2pt	13	88	3	88	0	88
Untreated check			0	84	0	84	0	84
LSD (0.05)			9	2	9	2	9	2

^aPOSTA=June 2; POSTB=June 17; POSTC=June 28.

^bBromoxynil&MCPA=Bronate; Clopyralid&MCPA=Curtail M; Bentazon&sethoxydim=Rezult; MSO=Destiny, a methylated seed oil from Agriliance, St. Paul, MN.

^cInjury=% growth reduction by visual evaluation 7 days after treatment.

^dPM=Physiological maturity from seeding date.

Table 4. Flax seed yield and test weight with three application timings of POST herbicides.

Treatment ^b	Herbicide	Rate	Herbicide application timing ^a						
			POSTA		POSTB		POSTC		
			Seed yield	Test weight	Seed yield	Test weight	Seed yield	Test weight	
		lb/A	bu/A	lb/A	bu/A	lb/bu	bu/bu	lb/A	lb/bu
Bromoxynil&MCPA		0.23&0.23	17.3	52.6	17.8	53.0	15.9	52.6	
Clopyralid&MCPA		0.07&0.39	19.9	52.9	17.9	52.9	12.5	53.2	
Bromoxynil&MCPA+clopyralid&MCPA		0.23&0.23+0.07&0.39	19.0	52.9	18.8	52.8	13.4	53.1	
Bromoxynil&MCPA+sethoxydim+COC		0.23&0.23+0.2+2pt	20.4	53.9	17.6	53.5	15.2	53.9	
Clopyralid&MCPA+sethoxydim+COC		0.07&0.39+0.2+2pt	19.3	53.8	17.1	53.9	13.5	54.3	
Bromoxynil&MCPA+clopyralid&MCPA+sethoxydim+COC		0.23&0.23+0.07&0.39+0.2+2pt	19.9	53.7	16.6	53.9	13.7	53.9	
Bentazon&sethoxydim+COC		1+0.2+2pt	19.1	53.8	15.7	51.0	13.8	53.3	
Untreated check			14.5	50.0	15.1	50.0	15.4	50.2	
LSD (0.05)			2.8	0.9	2.8	0.9	2.8	0.9	

^aPOSTA=June 2; POSTB=June 17; POSTC=June 28.

^bBromoxynil&MCPA=Bronate; Clopyralid&MCPA=Curtail M; Bentazon&sethoxydim=Rezult; MSO=Destiny, a methylated seed oil from Agriliance, St. Paul, MN