Timing of Fall Application of Pyroxasulfone for Weed Control in Field Pea at Hettinger, ND, 2025.

Timing and rate of fall application of pyroxasulfone was evaluated for both crop response and weed control in 2025 at Hettinger, ND (see Table 1 for treatments; Table 3 for description of applications). A fall application of glyphosate alone provided poor control of cheatgrass (30%). Application of glyphosate plus pyroxasulfone (Zidua SC) resulted in 92-97% control of cheatgrass and there was no difference between rate or timing. At 23 days after planting (DAP) Wild oat control with pyroxasulfone increased from 74 to 85% for 3 to 5 oz/A of Zidua SC at the September application and similarly from 74 to 86% for 3 to 5 oz/A of Zidua SC at the October application timing. After this evaluation, clethodim (Section 3) was applied over the entire trial to control grasses so there were no further evaluations. At 23 DAP, increasing Zidua rate increased kochia control and timing of application resulted in similar control in most cases. At 50 DAP, kochia control was also higher for the 5 oz/A rate of Zidua compared with 3 oz/A, with similar response in most cases for application timing. Wild buckwheat control was poor to fair regardless of Zidua application rate or timing. It is generally recommended to apply herbicides for residual weed control in the fall after soil temperatures have fallen to 40 to 50 F. While average soil temperature was greater at the September application timing, the lack of rainfall after this earlier application was likely responsible for results being similar to the later application timing. In years with greater fall rainfall, weed control would likely be reduced at the earlier application timing due to increased degradation of the herbicide in the fall.

Table 1. Evaluation of timing and rate for fall application of pyroxasulfone for weed control in field peas.

	Treatment[a]	Rate	Timing[b]	Cheatgrass	Wild oat	Kochia		Wild buckwheat	
				23 DAP	23 DAP	23 DAP	50 DAP	23 DAP	50 DAP
		oz/A		% control					
1	Untreated			0c	0d	0d	0d	0d	0e
2	Roundup PowerMax 3	22	Sept	30b	0d	0d	0d	0d	0e
3	Roundup PowerMax 3	22	Sept	92a	78bc	86ab	72b	62bc	41d
	Zidua SC	3	Sept						
4	Roundup PowerMax 3	22	Sept	97a	82ab	90ab	70b	66abc	50bc
	Zidua SC	4	Sept						
5	Roundup PowerMax 3	22	Sept	96a	85a	92a	81a	72ab	56ab
	Zidua SC	5	Sept						
6	Roundup PowerMax 3	22	Oct	30b	0d	0d	0d	0d	0e
7	Roundup PowerMax 3	22	Oct	94a	74c	77c	61c	61c	44cd
	Zidua SC	3	Oct						
8	Roundup PowerMax 3	22	Oct	93a	83ab	83bc	75b	74a	58a
	Zidua SC	4	Oct						
9	Roundup PowerMax 3	22	Oct	96a	86a	87ab	82a	65abc	63a
	Zidua SC	5	Oct						
LSD P=.05				12.2	6.9	6.9	6.2	10.6	6.3
Standard Deviation				10.1	5.7	5.7	5.1	8.8	5.2
CV				14.48	10.57	10.01	10.47	19.73	15.16
Treatment F				57.903	202.837	226.636	211.052	58.700	104.192
Treatment Prob(F)				0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

[a]Roundup PowerMax3, glyphosate 4.8 lbae/gal; Zidua SC, pyroxasulfone 4.17 lbai/gal. All treatments included AMS at 8.5 lb/100gal.

[b]Timings of application were September 24, 2024 and October 28, 2024.

[c]Abbreviations: DAP, days after planting; lbae/gal, pounds acid equivalent per gallon; lbai/gal, pounds active ingredient per gallon.

Fall herbicide treatments did not cause visible injury to peas (data not shown). Pea stand count was the least when no herbicide was pplied (untreated) and when only glyphosate was applied. In most cases, pea stand count was similar for the rates and timings of pyroxasulfone application. Pea height was reduced in treatments with poor weed control (especially with poor control of wild oat and cheatgrass). Pea yield was lowest in the untreated control and with a fall application of glyphosate alone. Pea yield was similar for all fall Zidua application rates and timings and was always greater than the untreated control and when only glyphosate was applied in the fall.

Table 2. Evaluation of fall application of metribuzin and pyroxasulfone for crop response in peas.

	Treatment[a]	Rate	Stand count 35 DAP	Pea height 51 DAP	Pea yield
		oz/A	plants/A	inches	lb/A
1	Untreated		266081d	10.6c	1443c
2	Roundup PowerMax 3	22	261022d	11.2bc	1601c
3	Roundup PowerMax 3 Zidua SC	22 3	278222bcd	12.2a	2335a
4	Roundup PowerMax 3 Zidua SC	22 4	273163cd	12.2a	2426a
5	Roundup PowerMax 3 Zidua SC	22 5	283280bcd	12.2a	2451a
6	Roundup PowerMax 3	22	261022d	10.9c	1674bc
7	Roundup PowerMax 3 Zidua SC	22 3	321725a	11.7ab	2126a
8	Roundup PowerMax 3 Zidua SC	22 4	301491abc	12.2a	2393a
9	Roundup PowerMax 3 Zidua SC	22 5	309585ab	11.6ab	2089ab
LSD P=.05			12.1	2.0	377.6
Standard Deviation			10.0	1.6	311.6
CV			15.06	5.58	17.37
Treatment F			0.679	6.250	12.940
Treatment Prob(F)			0.7051	0.0002	0.0001

[a]Roundup PowerMax3, glyphosate 4.8 lbae/gal; Zidua SC, pyroxasulfone 4.17 lbai/gal. All treatments included AMS at 8.5 lb/100gal.

[b]Timings of application were September 24, 2024 and October 28, 2024.

[c]Abbreviations: DAP, days after planting; lbae/gal, pounds acid equivalent per gallon; lbai/gal, pounds active ingredient per gallon.

Table 3. Application environment and equipment for preemergence application of herbicide treatments for weed control in peas.

Application Description			Application equipment	
Date	Sep-24-2024	Oct-28-2024	Equipment Type	Tractor mounted
Start Time	9:21 AM	4:58 PM	Operation Pressure	42 PSI
Stop Time	9:27 AM	5:08 PM	Nozzle Model	11002DG
Air Temperature Start, Stop	65.3, 67.5 F	57.6, 56.9 F	Nozzle Spacing	20 IN
% Relative Humidity Start, Stop	41.7, 45.1	29.6, 31.6	Boom Length	100 IN
Wind Velocity+Dir. Start	6.9 MPH, WNW	5.7 MPH, NW	Boom Height	22.0 IN
Wind Velocity+Dir. Max	7.3 MPH, WNW	5.7 MPH, NW	Ground Speed	4 MPH
Wet Leaves (Y/N)	N, no	N, no	Carrier	WATER
Soil Temperature	43 F	41 F	Application Amount	10 GAL/AC
% Cloud Cover	0	10	Propellant	CO2