

Performance of Pyroxasulfone Herbicide Programs for Weed Control in Soybean at Rochester, MN, in 2013.

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The objective of this trial was to evaluate the performance of pyroxasulfone herbicide programs for weed control in soybeans in southeastern Minnesota. The research site was a Lawler loam series with a pH of 6.8, O.M of 2.5%, and soil test P and K levels of 95 ppm and 225 ppm, respectively. The field was chisel plowed in the fall, disked in the spring and field cultivated once prior to planting. The soybean variety, DuPont Pioneer 91Y90, was planted on June 3, 2013, at a depth of 1.5 inches in 30 inch rows at a rate of 165,700 seeds per acre. A randomized complete block design was used with four replications. Preemergence (PRE) and postemergence (POST) treatments were applied with a tractor-mounted sprayer delivering 20 gpa at 32 psi using TeeJet 11002 air induction flat spray tips for PRE treatments, and Turbo TeeJet 11002 wide angle flat spray tip nozzles for POST applications. Evaluations of the plots were taken on June 20, 26, July 5, 15, and 22, and September 26, 2013. The center two rows of each plot were machine harvested on October 26, 2013. Application dates, environmental conditions, and weed stages are listed in Table 1. Herbicide performance for giant ragweed, common lambsquarters, common waterhemp and giant foxtail control, plus crop injury ratings are in Tables 2 through 6, respectively. (University of Minnesota Extension Regional Office, Rochester).

Table 1. Application timing, plant stage, environmental conditions.

Date	6/3	6/27
Treatment	PRE	POST I
Temperature		
Air	77	84
Soil	76.8	87.4
Relative Humidity (%)	44	44
Wind (mph)	8	17
Soil Moisture	Normal	Normal
Soybean		V2
Stage		3
Height (inches)		
Giant Ragweed		
Weed density (ft ²)		5.9
Height (inches)		
Common		
Lambsquarters		
Weed density (ft ²)		5.4
Height (inches)		
Common Waterhemp		
Weed density (ft ²)		2.3
Height (inches)		
Giant foxtail		
Weed density (ft ²)		1.4
Height (inches)		
Rainfall after each application		
Week 1	0.70	0.44
Week 2	0.43	0.35
Week 3	4.13	1.20

Table 2. Evaluation of pyroxasulfone herbicide systems for giant ragweed control in soybeans on June 20, 26, July 5, 15, and 22, and September 26, and grain yield at 13% moisture at Rochester, MN, in 2013.

Treatment	Rate (rate/A)	Giant Ragweed Control (% Control)						Yield (bu/A)
		6/20	6/26	7/5*	7/15	7/22	9/26	
Untreated		0	0	0	0	0	0	8.4
PRE								
Authority First	6.4 oz/a	73	77	91	76	76	73	24.1
Authority Assist + Sharpen	8 fl oz/a + 1 fl oz/a	95	91	97	87	88	85	30.7
Authority Elite + Sharpen	32 fl oz/a + 1 fl oz/a	97	93	96	87	87	84	31.0
Authority Elite + First Rate	32 fl oz/a + 0.3 oz/a	73	75	90	66	67	65	22.0
Authority Elite + First Rate	32 fl oz/a + 0.6 oz/a	83	82	95	78	78	78	26.8
Anthem + Sharpen	9 fl oz/a + 1 fl oz/a	96	91	96	86	84	81	33.1
(Optill PRO) Optill + Outlook	2 oz/a + 10 fl oz/a	97	91	98	92	91	89	32.7
(Gangster) Gangster FR + Gangster V	0.6 oz/a + 3 oz/a	82	84	95	83	83	80	27.6
PRE / POST I (V2)								
Fierce / Cobra + COC + N-Pak AMS	3 oz/a / 12 fl oz/a + 1pt/a + 3 qt/a	68	55	98	93	93	90	27.4
Anthem / Marvel + COC + N-Pak AMS	9 fl oz/a / 7 fl oz/a + 1pt/a + 3 qt/a	0	0	96	65	68	65	24.9
Authority First / Anthem + Roundup PowerMax + NIS + N-Pak AMS	5 oz/a / 7 fl oz/a + 32 fl oz/a + 0.25% V/V + 3 qt/a	73	75	99	97	96	95	35.8
Authority First / Marvel + Roundup PowerMax + NIS + N-Pak AMS	5 oz/a / 7 fl oz/a + 32 fl oz/a + 0.25% V/V + 3 qt/a	69	71	99	96	96	95	36.4
POST I (V2)								
Marvel + Roundup PowerMax + NIS + N-Pak AMS	7 fl oz/a + 32 fl oz/a + 0.25% V/V + 3 qt/a	0	0	98	92	93	92	32.5
Flexstar GT 3.5 + MSO + N-Pak AMS	3.5 pt/a + 0.5% V/V + 3 qt/a	0	0	98	92	93	93	37.5
Roundup PowerMax + N-Pak AMS	32 fl oz/a + 3 qt/a	0	0	98	92	92	89	34.7
LSD (P=0.10)		6	5	2	7	7	7	5.0

* Note different rating scale for this date.

Table 3. Evaluation of pyroxasulfone herbicide systems for common lambsquarters control in soybeans on June 20, 26, July 5, 15, and 22 and September 26, and grain yield at 13% moisture at Rochester, MN, in 2013.

Treatment	Rate	Common Lambsquarters Control						Yield
		6/20	6/26	7/5	7/15	7/22	9/26	
	(rate/A)	(% Control)						(bu/A)
Untreated		0	0	0	0	0	0	8.4
PRE								
Authority First	6.4 oz/a	99	99	99	99	99	99	24.1
Authority Assist + Sharpen	8 fl oz/a + 1 fl oz/a	99	99	99	99	99	99	30.7
Authority Elite + Sharpen	32 fl oz/a + 1 fl oz/a	99	99	99	99	99	99	31.0
Authority Elite + First Rate	32 fl oz/a + 0.3 oz/a	99	99	99	99	99	99	22.0
Authority Elite + First Rate	32 fl oz/a + 0.6 oz/a	99	99	99	99	99	99	26.8
Anthem + Sharpen	9 fl oz/a + 1 fl oz/a	99	99	99	88	85	86	33.1
(Optill PRO) Optill + Outlook	2 oz/a + 10 fl oz/a	99	99	99	99	99	99	32.7
(Gangster) Gangster FR + Gangster V	0.6 oz/a + 3 oz/a	99	99	99	99	99	99	27.6
PRE / POST I (V2)								
Fierce / Cobra + COC + N-Pak AMS	3 oz/a / 12 fl oz/a + 1pt/a + 3 qt/a	99	99	99	91	83	83	27.4
Anthem / Marvel + COC + N-Pak AMS	9 fl oz/a / 7 fl oz/a + 1pt/a + 3 qt/a	99	96	99	73	75	84	24.9
Authority First / Anthem + Roundup PowerMax + NIS + N-Pak AMS	5 oz/a / 7 fl oz/a + 32 fl oz/a + 0.25% V/V + 3 qt/a	99	99	99	99	99	99	35.8
Authority First / Marvel + Roundup PowerMax + NIS + N-Pak AMS	5 oz/a / 7 fl oz/a + 32 fl oz/a + 0.25% V/V + 3 qt/a	99	99	99	99	99	99	36.4
POST I (V2)								
Marvel + Roundup PowerMax + NIS + N-Pak AMS	7 fl oz/a + 32 fl oz/a + 0.25% V/V + 3 qt/a	0	0	99	97	94	89	32.5
Flexstar GT 3.5 + MSO + N-Pak AMS	3.5 pt/a + 0.5% V/V + 3 qt/a	0	0	99	84	84	84	37.5
Roundup PowerMax + N-Pak AMS	32 fl oz/a + 3 qt/a	0	0	99	78	76	81	34.7
LSD (P=0.10)		0	2	1	4	5	6	5.0

Table 4. Evaluation of pyroxasulfone herbicide systems for common waterhemp control in soybeans on June 20, 26, July 5, 15, and 22 and September 26, and grain yield at 13% moisture at Rochester, MN, in 2013.

Treatment	Rate	Common Waterhemp Control						Yield
		6/20	6/26	7/5	7/15	7/22	9/26	
	(rate/A)	(% Control)						(bu/A)
Untreated		0	0	0	0	0	0	8.4
PRE								
Authority First	6.4 oz/a	99	99	99	99	99	99	24.1
Authority Assist + Sharpen	8 fl oz/a + 1 fl oz/a	99	99	99	99	99	99	30.7
Authority Elite + Sharpen	32 fl oz/a + 1 fl oz/a	99	99	99	99	99	99	31.0
Authority Elite + First Rate	32 fl oz/a + 0.3 oz/a	99	99	99	99	99	99	22.0
Authority Elite + First Rate	32 fl oz/a + 0.6 oz/a	99	99	99	99	99	99	26.8
Anthem + Sharpen	9 fl oz/a + 1 fl oz/a	99	99	99	99	99	99	33.1
(Optill PRO) Optill + Outlook	2 oz/a + 10 fl oz/a	99	99	99	99	99	99	32.7
(Gangster) Gangster FR + Gangster V	0.6 oz/a + 3 oz/a	99	99	99	99	98	99	27.6
PRE / POST I (V2)								
Fierce / Cobra + COC + N-Pak AMS	3 oz/a / 12 fl oz/a + 1pt/a + 3 qt/a	97	61	99	99	97	99	27.4
Anthem / Marvel + COC + N-Pak AMS	9 fl oz/a / 7 fl oz/a + 1pt/a + 3 qt/a	99	99	99	99	99	99	24.9
Authority First / Anthem + Roundup PowerMax + NIS + N-Pak AMS	5 oz/a / 7 fl oz/a + 32 fl oz/a + 0.25% V/V + 3 qt/a	99	98	99	99	99	99	35.8
Authority First / Marvel + Roundup PowerMax + NIS + N-Pak AMS	5 oz/a / 7 fl oz/a + 32 fl oz/a + 0.25% V/V + 3 qt/a	99	99	99	99	99	99	36.4
POST I (V2)								
Marvel + Roundup PowerMax + NIS + N-Pak AMS	7 fl oz/a + 32 fl oz/a + 0.25% V/V + 3 qt/a	0	0	99	96	96	98	32.5
Flexstar GT 3.5 + MSO + N-Pak AMS	3.5 pt/a + 0.5% V/V + 3 qt/a	0	0	99	98	99	99	37.5
Roundup PowerMax + N-Pak AMS	32 fl oz/a + 3 qt/a	0	0	99	82	83	90	34.7
LSD (P=0.10)		1	4	1	3	4	2	5.0

Table 5. Evaluation of pyroxasulfone herbicide systems for grass control in soybeans on June 20, 26, July 5, 15, and 22 and September 26, and grain yield at 13% moisture at Rochester, MN, in 2013.

Treatment	Rate	Grass Control						Yield
		6/20	6/26	7/5	7/15	7/22	9/26	
	(rate/A)	(% Control)						(bu/A)
Untreated		0	0	0	0	0	0	8.4
PRE								
Authority First	6.4 oz/a	99	99	99	99	98	99	24.1
Authority Assist + Sharpen	8 fl oz/a + 1 fl oz/a	99	99	99	98	98	98	30.7
Authority Elite + Sharpen	32 fl oz/a + 1 fl oz/a	99	99	99	99	99	99	31.0
Authority Elite + First Rate	32 fl oz/a + 0.3 oz/a	99	99	99	99	99	99	22.0
Authority Elite + First Rate	32 fl oz/a + 0.6 oz/a	99	99	99	99	99	99	26.8
Anthem + Sharpen	9 fl oz/a + 1 fl oz/a	99	99	99	99	99	99	33.1
(Optill PRO) Optill + Outlook	2 oz/a + 10 fl oz/a	99	99	99	99	99	99	32.7
(Gangster) Gangster FR + Gangster V	0.6 oz/a + 3 oz/a	99	99	99	99	99	99	27.6
PRE / POST I (V2)								
Fierce / Cobra + COC + N-Pak AMS	3 oz/a / 12 fl oz/a + 1pt/a + 3 qt/a	99	99	99	96	91	91	27.4
Anthem / Marvel + COC + N-Pak AMS	9 fl oz/a / 7 fl oz/a + 1pt/a + 3 qt/a	99	99	99	98	99	99	24.9
Authority First / Anthem + Roundup PowerMax + NIS + N-Pak AMS	5 oz/a / 7 fl oz/a + 32 fl oz/a + 0.25% V/V + 3 qt/a	99	99	99	99	99	99	35.8
Authority First / Marvel + Roundup PowerMax + NIS + N-Pak AMS	5 oz/a / 7 fl oz/a + 32 fl oz/a + 0.25% V/V + 3 qt/a	99	99	99	99	99	99	36.4
POST I (V2)								
Marvel + Roundup PowerMax + NIS + N-Pak AMS	7 fl oz/a + 32 fl oz/a + 0.25% V/V + 3 qt/a	0	0	99	99	98	99	32.5
Flexstar GT 3.5 + MSO + N-Pak AMS	3.5 pt/a + 0.5% V/V + 3 qt/a	0	0	99	99	99	99	37.5
Roundup PowerMax + N-Pak AMS	32 fl oz/a + 3 qt/a	0	0	99	94	91	96	34.7
LSD (P=0.10)		0	0	1	2	3	3	5.0

Table 6. Soybean response to pyroxasulfone herbicide systems on June 20, 26, and July 5, 15, and 22 at Rochester, MN, in 2013.

Treatment	Rate (rate/A)	Injury				Yield (bu/A)
		6/20	6/26	7/5	7/15	
Untreated		0	0	0	0	8.4
PRE						
Authority First	6.4 oz/a	0	0	0	0	24.1
Authority Assist + Sharpen	8 fl oz/a + 1 fl oz/a	9	0	0	0	30.7
Authority Elite + Sharpen	32 fl oz/a + 1 fl oz/a	4	0	0	0	31.0
Authority Elite + First Rate	32 fl oz/a + 0.3 oz/a	0	0	0	0	22.0
Authority Elite + First Rate	32 fl oz/a + 0.6 oz/a	1	0	0	0	26.8
Anthem + Sharpen	9 fl oz/a + 1 fl oz/a	8	0	0	0	33.1
(Optill PRO) Optill + Outlook	2 oz/a + 10 fl oz/a	6	0	0	0	32.7
(Gangster) Gangster FR + Gangster V	0.6 oz/a + 3 oz/a	14	20	0	0	27.6
PRE / POST I (V2)						
Fierce / Cobra + COC + N-Pak AMS	3 oz/a / 12 fl oz/a + 1pt/a + 3 qt/a	0	0	70	20	27.4
Anthem / Marvel + COC + N-Pak AMS	9 fl oz/a / 7 fl oz/a + 1pt/a + 3 qt/a	0	0	58	16	24.9
Authority First / Anthem + Roundup PowerMax + NIS + N-Pak AMS	5 oz/a / 7 fl oz/a + 32 fl oz/a + 0.25% V/V + 3 qt/a	0	0	55	19	35.8
Authority First / Marvel + Roundup PowerMax + NIS + N-Pak AMS	5 oz/a / 7 fl oz/a + 32 fl oz/a + 0.25% V/V + 3 qt/a	0	0	59	20	36.4
POST I (V2)						
Marvel + Roundup PowerMax + NIS + N-Pak AMS	7 fl oz/a + 32 fl oz/a + 0.25% V/V + 3 qt/a	0	0	60	21	32.5
Flexstar GT 3.5 + MSO + N-Pak AMS	3.5 pt/a + 0.5% V/V + 3 qt/a	0	0	44	18	37.5
Roundup PowerMax + N-Pak AMS	32 fl oz/a + 3 qt/a	0	0	0	1	34.7
LSD (P=0.10)		2	0	4	3	5.0