

Evaluating the effectiveness of the pyroxasulfone based herbicide Anthem and tank mixtures with other potential broadleaf herbicides for improved weed control in field corn

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The objective of this trial was to evaluate preemergence and postemergence proxasulfone based systems for weed control in field corn in southeastern Minnesota. The research site was a Lawler loam series with a pH of 6.7, O.M. of 2.5%, and soil test P and K levels of 69 ppm and 180 ppm, respectively. Spring fertilizer was broadcast on April 26 ahead of planting at a rate of 130-26-120-24 (N-P-K-S). The field was spring disked and field cultivated once prior to planting. The corn hybrid, Pioneer P9917AMX (99 day), was planted on May 13, 2013 at a depth of 1.5 inches in 30 inch rows at a rate of 32,000 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 15 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 4, 17, 26, and July 10, 2013. The center two rows of each plot were machine harvested on November 8, 2013. Application dates, environmental conditions, and weed stages are listed below in Table 1. Herbicide performance for giant ragweed, common lambsquarters, common waterhemp and grasses, plus plant injury ratings can be seen in Tables 2 through 6 respectively. (University of Minnesota Extension Regional Office – Rochester)

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

Date	5/14	6/3	6/14
Treatment	PRE	Post I	Post II
Temperature (F)			
Air	71	65	71
Soil	55.2	68.5	73.6
Relative Humidity (%)	49	46	61
Wind (mph)	8	6	14
Soil Moisture	Normal	Normal	Normal
Corn		V2	V4
Stage		4	6
Height (inch)			
Giant Ragweed			
Weed density (ft ²)		15	11.4
Height (inch)		2.5	2.8
Common Lambsquarters			
Weed density (ft ²)		5.9	11.4
Height (inch)		0.7	1.4
Common Waterhemp			
Weed density (ft ²)		70.0	99.8
Height (inch)		0.5	1.0
Grass			
Weed density (ft ²)		1.9	4.3
Height (inch)		0.6	1.6
Rainfall after each application (inch)			
Week 1	4.69	0.70	1.47
Week 2	3.05	0.43	5.38
Week 3	0.47	4.13	0.44

Table 2. Evaluation of preemergence and postemergence weed control for giant ragweed control in field corn on June 4, 17, 26 and July 10, at Rochester, MN, in 2013.

Treatment	Rate (rate/A)	Giant Ragweed Control				Yield (bu/A)
		6/4	6/17	6/26	7/10	
Untreated Check		0	0	0	0	11.4
PRE / POST II (V4 Corn)						
Anthem / F9387 + Roundup PowerMax + N-Pak AMS	10 fl oz/ a + 3 fl oz/a + 32 fl oz/a + 3 qt/a	69	84	97	96	205.8
Anthem+ Sharpen / Roundup PowerMax + N-Pak AMS	10 fl oz/a + 2 fl oz/a + 32 fl oz/a + 3 qt/a	68	81	95	95	203.1
Anthem + F9387 / Roundup PowerMax + COC + N-Pak AMS	10 fl oz/a + 2 fl oz/a + 32 fl oz/a + 3 qt/a	49	83	97	97	202.5
Anthem / F9387 + Status + Roundup PowerMax + COC+ N- Pak AMS	10 fl oz/a + 3 fl oz/a + 2.5 oz/a + 32 fl oz/a + 1 qt/a + 3 qt/a	45	89	97	97	217.3
Anthem + Stinger / Roundup PowerMax+ N-Pak AMS	10 fl oz/a + 4 fl oz/a + 32 fl oz/a + 3 qt/a	65	71	96	93	212.2
Anthem / F9387 + Liberty 280 + COC + N-Pak AMS	10 fl oz/a + 3 fl oz/a + 1 qt/a + 3 qt/a	35	89	98	96	211.3
Anthem / F9387 + COC + N-Pak AMS	10 fl oz/a + 3 fl oz/a + 1 qt/a + 3 qt/a	35	81	93	92	199.6
SureStart / Roundup PowerMax + N-Pak AMS	2 pt/a + 32 fl oz/a + 3 qt/a	73	75	95	95	230.3
Zemax / Roundup PowerMax + N-Pak AMS	2 qt/a + 32 fl oz/a + 3 qt/a	71	82	93	91	240.9
POST I (V2 Corn)						
F9387 + Liberty 280 + COC+ N-Pak AMS	3 fl oz/a + 28 fl oz/a + 1 qt/a + 3 qt/ a	0	92	94	92	226.9
F9387 + Roundup PowerMax + COC + N-Pak AMS	3 fl oz/a + 32 fl oz/ a + 1 qt/a + 3 qt/a	0	92	95	92	212.2
F9387 + Status + Roundup PowerMax + N-Pak AMS	3 fl oz/a + 2.5 oz/a + 32 fl oz/a + 3 qt/a	0	94	95	94	227.2
Anthem + Liberty 280 + NIS+ N-Pak AMS	8 fl oz/a + 28 fl oz/a + 0.25% fl oz/a + 3 qt/a	0	84	85	76	159.8
Halex GT + NIS + N-Pak AMS	3.6 pt/a + 0.5% v/v + 3 qt/a	0	94	93	93	222.0
Roundup PowerMax+ N-Pak AMS	32 fl oz/a + 3 qt/a	0	87	84	76	198.2
LSD (P=0.10)		13	7	3	6	30.4

Table 3. Evaluation of preemergence and postemergence weed control for common lambsquarters control in field corn on June 4, 17, 26 and July 10, at Rochester, MN, in 2013.

Treatment	Rate	Common Lambsquarters Control				Yield
		6/4	6/17	6/26	7/10	
	(rate/A)	(%)				(bu/A)
Untreated Check		0	0	0	0	11.4
PRE / POST II (V4 Corn)						
Anthem / F9387 + Roundup PowerMax + N-Pak AMS	10 fl oz/ a + 3 fl oz/a + 32 fl oz/a + 3 qt/a	99	99	99	97	205.8
Anthem+ Sharpen / Roundup PowerMax + N-Pak AMS	10 fl oz/a + 2 fl oz/a + 32 fl oz/a + 3 qt/a	99	99	99	96	203.1
Anthem + F9387 / Roundup PowerMax + COC + N-Pak AMS	10 fl oz/a + 2 fl oz/a + 32 fl oz/a + 3 qt/a	99	99	99	99	202.5
Anthem / F9387 + Status + Roundup PowerMax + COC+ N- Pak AMS	10 fl oz/a + 3 fl oz/a + 2.5 oz/a + 32 fl oz/a + 1 qt/a + 3 qt/a	99	99	99	99	217.3
Anthem + Stinger / Roundup PowerMax+ N-Pak AMS	10 fl oz/a + 4 fl oz/a + 32 fl oz/a + 3 qt/a	99	99	99	94	212.2
Anthem / F9387 + Liberty 280 + COC + N-Pak AMS	10 fl oz/a + 3 fl oz/a + 1 qt/a + 3 qt/a	99	99	99	99	211.3
Anthem / F9387 + COC + N-Pak AMS	10 fl oz/a + 3 fl oz/a + 1 qt/a + 3 qt/a	99	99	99	99	199.6
SureStart / Roundup PowerMax + N-Pak AMS	2 pt/a + 32 fl oz/a + 3 qt/a	99	99	99	98	230.3
Zemax / Roundup PowerMax + N-Pak AMS	2 qt/a + 32 fl oz/a + 3 qt/a	99	99	99	97	240.9
POST I (V2 Corn)						
F9387 + Liberty 280 + COC+ N-Pak AMS	3 fl oz/a + 28 fl oz/a + 1 qt/a + 3 qt/ a	0	99	99	99	226.9
F9387 + Roundup PowerMax + COC + N-Pak AMS	3 fl oz/a + 32 fl oz/ a + 1 qt/a + 3 qt/a	0	99	99	98	212.2
F9387 + Status + Roundup PowerMax + N-Pak AMS	3 fl oz/a + 2.5 oz/a + 32 fl oz/a + 3 qt/a	0	99	99	99	227.2
Anthem + Liberty 280 + NIS+ N-Pak AMS	8 fl oz/a + 28 fl oz/a + 0.25% fl oz/a + 3 qt/a	0	99	98	98	159.8
Halex GT + NIS + N-Pak AMS	3.6 pt/a + 0.5% v/v + 3 qt/a	0	99	99	99	222.0
Roundup PowerMax+ N-Pak AMS	32 fl oz/a + 3 qt/a	0	86	98	86	198.2
LSD (P=0.10)		0	1	1	3	30.4

Table 4. Evaluation of preemergence and postemergence weed control for common waterhemp control in field corn on June 4, 17, 26 and July 10, at Rochester, MN, in 2013.

Treatment	Rate (rate/A)	Common Waterhemp Control				Yield (bu/A)
		6/4	6/17	6/26	7/10	
		Common Waterhemp Control (%)				
Untreated Check		0	0	0	0	11.4
PRE / POST II (V4 Corn)						
Anthem / F9387 + Roundup PowerMax + N-Pak AMS	10 fl oz/ a + 3 fl oz/a + 32 fl oz/a + 3 qt/a	99	99	97	97	205.8
Anthem+ Sharpen / Roundup PowerMax + N-Pak AMS	10 fl oz/a + 2 fl oz/a + 32 fl oz/a + 3 qt/a	99	99	98	96	203.1
Anthem + F9387 / Roundup PowerMax + COC + N-Pak AMS	10 fl oz/a + 2 fl oz/a + 32 fl oz/a + 3 qt/a	99	99	99	98	202.5
Anthem / F9387 + Status + Roundup PowerMax + COC+ N- Pak AMS	10 fl oz/a + 3 fl oz/a + 2.5 oz/a + 32 fl oz/a + 1 qt/a + 3 qt/a	99	99	99	99	217.3
Anthem + Stinger / Roundup PowerMax+ N-Pak AMS	10 fl oz/a + 4 fl oz/a + 32 fl oz/a + 3 qt/a	99	99	97	96	212.2
Anthem / F9387 + Liberty 280 + COC + N-Pak AMS	10 fl oz/a + 3 fl oz/a + 1 qt/a + 3 qt/a	99	99	99	99	211.3
Anthem / F9387 + COC + N-Pak AMS	10 fl oz/a + 3 fl oz/a + 1 qt/a + 3 qt/a	99	99	98	99	199.6
SureStart / Roundup PowerMax + N-Pak AMS	2 pt/a + 32 fl oz/a + 3 qt/a	99	99	96	88	230.3
Zemax / Roundup PowerMax + N-Pak AMS	2 qt/a + 32 fl oz/a + 3 qt/a	99	99	97	90	240.9
POST I (V2 Corn)						
F9387 + Liberty 280 + COC+ N-Pak AMS	3 fl oz/a + 28 fl oz/a + 1 qt/a + 3 qt/ a	0	99	98	95	226.9
F9387 + Roundup PowerMax + COC + N-Pak AMS	3 fl oz/a + 32 fl oz/ a + 1 qt/a + 3 qt/a	0	99	98	95	212.2
F9387 + Status + Roundup PowerMax + N-Pak AMS	3 fl oz/a + 2.5 oz/a + 32 fl oz/a + 3 qt/a	0	99	98	95	227.2
Anthem + Liberty 280 + NIS+ N-Pak AMS	8 fl oz/a + 28 fl oz/a + 0.25% fl oz/a + 3 qt/a	0	99	97	98	159.8
Halex GT + NIS + N-Pak AMS	3.6 pt/a + 0.5% v/v + 3 qt/a	0	99	98	98	222.0
Roundup PowerMax+ N-Pak AMS	32 fl oz/a + 3 qt/a	0	73	81	81	198.2
LSD (P=0.10)		0	1	2	3	30.4

Table 5. Evaluation of preemergence and postemergence weed control for grass control in field corn on June 4, 17, 26 and July 10, at Rochester, MN, in 2013.

Treatment	Rate	Grass Control				Yield
		6/4	6/17	6/26	7/10	
	(rate/A)	(%)				(bu/A)
Untreated Check		0	0	0	0	11.4
PRE / POST II (V4 Corn)						
Anthem / F9387 + Roundup PowerMax + N-Pak AMS	10 fl oz/ a + 3 fl oz/a + 32 fl oz/a + 3 qt/a	99	99	99	98	205.8
Anthem+ Sharpen / Roundup PowerMax + N-Pak AMS	10 fl oz/a + 2 fl oz/a + 32 fl oz/a + 3 qt/a	99	99	99	99	203.1
Anthem + F9387 / Roundup PowerMax + COC + N-Pak AMS	10 fl oz/a + 2 fl oz/a + 32 fl oz/a + 3 qt/a	99	99	99	99	202.5
Anthem / F9387 + Status + Roundup PowerMax + COC+ N- Pak AMS	10 fl oz/a + 3 fl oz/a + 2.5 oz/a + 32 fl oz/a + 1 qt/a + 3 qt/a	99	99	99	99	217.3
Anthem + Stinger / Roundup PowerMax+ N-Pak AMS	10 fl oz/a + 4 fl oz/a + 32 fl oz/a + 3 qt/a	99	99	99	99	212.2
Anthem / F9387 + Liberty 280 + COC + N-Pak AMS	10 fl oz/a + 3 fl oz/a + 1 qt/a + 3 qt/a	99	99	99	99	211.3
Anthem / F9387 + COC + N-Pak AMS	10 fl oz/a + 3 fl oz/a + 1 qt/a + 3 qt/a	99	99	99	99	199.6
SureStart / Roundup PowerMax + N-Pak AMS	2 pt/a + 32 fl oz/a + 3 qt/a	99	99	99	99	230.3
Zemax / Roundup PowerMax + N-Pak AMS	2 qt/a + 32 fl oz/a + 3 qt/a	99	99	99	99	240.9
POST I (V2 Corn)						
F9387 + Liberty 280 + COC+ N-Pak AMS	3 fl oz/a + 28 fl oz/a + 1 qt/a + 3 qt/ a	0	99	98	95	226.9
F9387 + Roundup PowerMax + COC + N-Pak AMS	3 fl oz/a + 32 fl oz/ a + 1 qt/a + 3 qt/a	0	99	99	96	212.2
F9387 + Status + Roundup PowerMax + N-Pak AMS	3 fl oz/a + 2.5 oz/a + 32 fl oz/a + 3 qt/a	0	99	99	97	227.2
Anthem + Liberty 280 + NIS+ N-Pak AMS	8 fl oz/a + 28 fl oz/a + 0.25% fl oz/a + 3 qt/a	0	99	99	99	159.8
Halex GT + NIS + N-Pak AMS	3.6 pt/a + 0.5% v/v + 3 qt/a	0	99	99	99	222.0
Roundup PowerMax+ N-Pak AMS	32 fl oz/a + 3 qt/a	0	93	98	94	198.2
LSD (P=0.10)		0	1	1	3	30.4

Table 6. Evaluation of postemergence crop response in field corn on June 17, and 26, and July 10 and plant height on July 12, at Rochester, MN, in 2013.

Treatment	Rate	Injury			Height 7/12	Yield
		6/17	6/26	7/10		
	(rate/A)	Injury (%)			Height (ft)	Yield (bu/A)
Untreated Check		0	0	0	4.3	11.4
PRE / POST II (V4 Corn)						
Anthem / F9387 + Roundup PowerMax + N-Pak AMS	10 fl oz/ a + 3 fl oz/a + 32 fl oz/a + 3 qt/a	6	0	0	4.9	205.8
Anthem+ Sharpen / Roundup PowerMax + N-Pak AMS	10 fl oz/a + 2 fl oz/a + 32 fl oz/a + 3 qt/a	5	0	0	4.8	203.1
Anthem + F9387 / Roundup PowerMax + COC + N-Pak AMS	10 fl oz/a + 2 fl oz/a + 32 fl oz/a + 3 qt/a	28	0	0	4.2	202.5
Anthem / F9387 + Status + Roundup PowerMax + COC+ N- Pak AMS	10 fl oz/a + 3 fl oz/a + 2.5 oz/a + 32 fl oz/a + 1 qt/a + 3 qt/a	21	0	0	4.7	217.3
Anthem + Stinger / Roundup PowerMax+ N-Pak AMS	10 fl oz/a + 4 fl oz/a + 32 fl oz/a + 3 qt/a	6	0	0	4.6	212.2
Anthem / F9387 + Liberty 280 + COC + N-Pak AMS	10 fl oz/a + 3 fl oz/a + 1 qt/a + 3 qt/a	34	0	0	4.6	211.3
Anthem / F9387 + COC + N-Pak AMS	10 fl oz/a + 3 fl oz/a + 1 qt/a + 3 qt/a	25	0	0	4.4	199.6
SureStart / Roundup PowerMax + N-Pak AMS	2 pt/a + 32 fl oz/a + 3 qt/a	6	0	0	5.3	230.3
Zemax / Roundup PowerMax + N-Pak AMS	2 qt/a + 32 fl oz/a + 3 qt/a	5	0	0	5.2	240.9
POST I (V2 Corn)						
F9387 + Liberty 280 + COC+ N-Pak AMS	3 fl oz/a + 28 fl oz/a + 1 qt/a + 3 qt/ a	13	0	0	5.1	226.9
F9387 + Roundup PowerMax + COC + N-Pak AMS	3 fl oz/a + 32 fl oz/ a + 1 qt/a + 3 qt/a	9	0	0	5.0	212.2
F9387 + Status + Roundup PowerMax + N-Pak AMS	3 fl oz/a + 2.5 oz/a + 32 fl oz/a + 3 qt/a	6	0	0	5.7	227.2
Anthem + Liberty 280 + NIS+ N-Pak AMS	8 fl oz/a + 28 fl oz/a + 0.25% fl oz/a + 3 qt/a	6	0	0	5.6	159.8
Halex GT + NIS + N-Pak AMS	3.6 pt/a + 0.5% v/v + 3 qt/a	5	0	0	5.7	222.0
Roundup PowerMax+ N-Pak AMS	32 fl oz/a + 3 qt/a	5	0	0	5.5	198.2
LSD (P=0.10)		3	0	0	0.8	30.4