

Comparisons of PRE/POST Weed Control Programs in Field Corn at Rochester, MN in 2016

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The objective of this trial was to evaluate PRE/POST programs for weed control and crop response in field corn in southeastern Minnesota. The research site was a Lawler loam series with a pH of 6.4, O.M. of 2.4%, and soil test P and K levels of 35 ppm and 165 ppm, respectively. Fertilizer was applied in the fall on November 5, 2015, at a rate of 0-46-180-0 lbs/A. Spring fertilizer was broadcast ahead of planting on April 16, 2016 at a rate of 115-0-0-25 (N-P-K-S). The field was spring disked and field cultivated once prior to planting. The previous crop was soybean. The corn hybrid, DEKALB DKC49-72RIB, was planted April 25, 2016 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 three replications. Preemergence (PRE) and postemergence (POST) treatments were applied with a tractor-mounted sprayer delivering 15 gpa at 30 psi using TTI 11002 spray tips. Evaluations of the plots were taken May 19, 24, 31, June 6, 13 and September 13, 2016. The center two rows of each plot were machine harvested on October 19, 2016. Application dates, environmental conditions and weed stages can be found in Table 1. Performance ratings for control of giant ragweed, common lambsquarter, common waterhemp, and grass, plus crop response ratings are found in Tables 2 through 6, respectively. (University of Minnesota Extension Regional Office, Rochester.)

Table 1. Application timing, plant stage, environmental conditions

Date	4/26	5/20	5/24	6/2
Treatment	PRE (A)	POST I (B)	POST II (C)	POST III (D)
Temperature (F)				
Air	49	68	75	64
Soil	58.3	71.0	72.6	64.1
Relative Humidity (%)	80	38	68	64
Wind (mph)	16	15	9	8
Soil Moisture	Normal	Normal	Normal	Normal
Corn				
Stage		2-collar	3-collar	5-collar
Height (inch)		2.8	4.3	10.8
Giant Ragweed				
Weed Density (ft ²)				21
Height (inch)		1.3	2.0	5.0
Common Waterhemp				
Weed Density (ft ²)				9.0
Height (inch)		0.4	0.4	1.7
Common Lambsquarter				
Weed Density (ft ²)				5
Height (inch)		0.8	1.3	1.6
Grass				
Weed Density (ft ²)				49
Height (inch)		0.3	0.4	2.3
Rainfall after each application (inch)				
Week 1	0.77	2.12	2.79	0.9
Week 2	0.00	0.99	1.22	3.75
Week 3	1.43	2.27	2.66	0.30

Table 2. Comparisons of PRE/POST programs for control of giant ragweed in field corn at Rochester Minnesota, in 2016.

Pest Code			AMBTR						YIELD		
Pest Name			Giant ragweed						@15% BU/A		
Rating Date			May-19	May-24	May-31	Jun-6	Jun-13	Sep-13			
Trt	Treatment	Rate	Appl	Percent Control (%)							
12	UNTREATED CHECK			0 e	0 h	0 e	0 e	0 h	0 g	2	e
A = PRE 4-26-16											
1	SOA 14, 15, 27, 5			85 c	88 cd	86 c	83 d	82 g	82 f	100	d
	ANTHEM MAX	4 fl oz/a	A								
	BALANCE FLEX	2 fl oz/a	A								
	ATRAZINE	1 qt/a	A								
2	SOA 5, 15, 27,			92 ab	95 ab	94 ab	96 b	95 cd	95 bc	187	ab
	ACURON	2.5 qt/a	A								
3	SOA 2, 27			82 c	93 ab	92 abc	91 c	89 f	89 e	158	c
	CORVUS	5.6 fl oz/a	A								
A/C = PRE 4-26-16 / POST II 5-24-16 (EAPOWE – 2 inch weeds)											
5	SOA 14, 15, 5 / 14, 27, 5, 9			82 c	85 de	97 a	98 a	98 a	97 ab	199	ab
	ANTHEM MAX	4.5 fl oz/a	A								
	ATRAZINE	1 qt/a	A								
	SOLSTICE	2.5 fl oz/a	C								
	ATRAZINE	1 pt/a	C								
	ROUNDUP POWERMAX	32 fl oz/a	C								
	Ammonium Sulfate	3.3 lb/100 gal	C								
6	SOA 14, 15 / 14, 27, 9			28 d	22 g	97 a	96 ab	95 d	94 cd	195	ab
	ANTHEM MAX	4.5 fl oz/a	A								
	SOLSTICE	2.5 fl oz/a	C								
	ROUNDUP POWERMAX	32 fl oz/a	C								
	Ammonium Sulfate	3.3 lb/100 gal	C								
AD = /PRE 4-26-16 / POST III 6-2-16 (MIPOWE – 2 to 3 inch weeds)											
4	SOA 14, 15 / 9			96 a	96 a	89 bc	96 ab	97 a-d	96 bc	194	ab
	ANTHEM MAX	5 fl oz/a	A								
	SHARPEN	2 fl oz/a	A								
	ROUNDUP POWERMAX	32 fl oz/a	D								
	Ammonium Sulfate	3.3 lb/100 gal	D								
7	SOA 14, 5 / 14, 15, 9			93 ab	94 ab	91 abc	96 ab	96 a-d	96 bc	202	ab
	SHARPEN	2 fl oz/a	A								
	ATRAZINE	1 qt/a	A								
	ANTHEM MAX	4 fl oz/a	D								
	ROUNDUP POWERMAX	32 fl oz/a	D								
	Ammonium Sulfate	3.3 lb/100 gal	D								
8	SOA 2,4,15 / 9			91 b	91 bc	77 d	95 b	95 bcd	94 cd	202	ab
	SURESTART II	2 pt/a	A								
	ROUNDUP POWERMAX	32 fl oz/a	D								
	Ammonium Sulfate	3.3 lb/100 gal	D								
B = POST I 5-20-16 (EAPOWE –1-2 inch weeds)											
9	SOA 15, 27, 9			0 e	33 f	97 a	97 ab	97 abc	99 a	188	ab
	ACURON FLEXI	2.25 qt/a	B								
	ROUNDUP POWERMAX	32 fl oz/a	B								
	Ammonium Sulfate	3.3 lb/100 gal	B								
10	SOA 14, 15, 27, 5, 9			0 e	82 e	97 a	98 a	97 ab	98 ab	206	a
	ANTHEM MAX	2 fl oz/a	B								
	SOLSTICE	2.5 fl oz/a	B								
	ATRAZINE	1 qt/a	B								
	ROUNDUP POWERMAX	32 fl oz/a	B								
	Ammonium Sulfate	3.3 lb/100 gal	B								
11	SOA 9, 15, 27			0 e	30 f	92 abc	93 c	92 e	92 d	186	b
	HALEX GT	3.6 pt/a	B								
	Ammonium Sulfate	3.3 lb/100 gal	B								
	NIS	0.25 % v/v	B								
LSD P=.10				5	5	7	2	2	3	18.9	

Means followed by same letter do not significantly differ.

Table 3. Comparisons of PRE/POST programs for control of common lambsquarters in field corn at Rochester, MN in 2016.

Pest Code	CHEAL										YIELD			
	Common lambsquarters													
Pest Name											@15%			
Rating Date	May-19	May-24	May-31	Jun-6	Jun-13	Sep-13								
Trt Treatment	Rate	Appl	Percent Control (%)										BU/A	
12 UNTREATED CHECK	0	b	0	e	0	b	0	b	0	b	0	c	2	e
A = PRE 4-26-16														
1 SOA 14, 15, 27, 5			99	a	99	a	99	a	99	a	99	a	100	d
ANTHEM MAX	4 fl oz/a	A												
BALANCE FLEX	2 fl oz/a	A												
ATRAZINE	1 qt/a	A												
2 SOA 5, 15, 27, ACURON	2.5 qt/a	A	99	a	99	a	99	a	99	a	99	a	187	ab
3 SOA 2, 27 CORVUS	5.6 fl oz/a	A	99	a	99	a	99	a	99	a	99	a	158	c
A/C = PRE 4-26-16 / POST II 5-24-16 (EAPOWE - 2 inch weeds)														
5 SOA 14, 15, 5 / 14, 27, 5, 9			99	a	99	a	99	a	99	a	99	a	199	ab
ANTHEM MAX	4.5 fl oz/a	A												
ATRAZINE	1 qt/a	A												
SOLSTICE	2.5 fl oz/a	C												
ATRAZINE	1 pt/a	C												
ROUNDUP POWERMAX	32 fl oz/a	C												
Ammonium Sulfate	3.3 lb/100 gal	C												
6 SOA 14, 15 / 14, 27, 9			99	a	98	ab	99	a	99	a	99	a	195	ab
ANTHEM MAX	4.5 fl oz/a	A												
SOLSTICE	2.5 fl oz/a	C												
ROUNDUP POWERMAX	32 fl oz/a	C												
Ammonium Sulfate	3.3 lb/100 gal	C												
A/D = PRE 4-26-16 / POST III 6-2-16 (MIPOWE - 2 to 3 inch weeds)														
4 SOA 14, 15 / 9			99	a	99	a	99	a	99	a	99	a	97	b
ANTHEM MAX	5 fl oz/a	A												
SHARPEN	2 fl oz/a	A												
ROUNDUP POWERMAX	32 fl oz/a	D												
Ammonium Sulfate	3.3 lb/100 gal	D												
7 SOA 14, 5 / 14, 15, 9			99	a	99	a	99	a	99	a	99	a	202	ab
SHARPEN	2 fl oz/a	A												
ATRAZINE	1 qt/a	A												
ANTHEM MAX	4 fl oz/a	D												
ROUNDUP POWERMAX	32 fl oz/a	D												
Ammonium Sulfate	3.3 lb/100 gal	D												
8 SOA 2,4,15 / 9			99	a	99	a	99	a	99	a	99	a	98	a
SURESTART II	2 pt/a	A												
ROUNDUP POWERMAX	32 fl oz/a	D												
Ammonium Sulfate	3.3 lb/100 gal	D												
(B =)POST I 5-20-16 (EAPOWE -1-2 inch weeds)														
9 SOA 15, 27, 9			0	b	35	c	99	a	99	a	99	a	99	a
ACURON FLEXI	2.25 qt/a	B												
ROUNDUP POWERMAX	32 fl oz/a	B												
Ammonium Sulfate	3.3 lb/100 gal	B												
10 SOA 14, 15, 27, 5, 9			0	b	96	b	99	a	99	a	99	a	99	a
ANTHEM MAX	2 fl oz/a	B												
SOLSTICE	2.5 fl oz/a	B												
ATRAZINE	1 qt/a	B												
ROUNDUP POWERMAX	32 fl oz/a	B												
Ammonium Sulfate	3.3 lb/100 gal	B												
11 SOA 9, 15, 27			0	b	30	d	99	a	99	a	99	a	99	a
HALEX GT	3.6 pt/a	B												
Ammonium Sulfate	3.3 lb/100 gal	B												
NIS	0.25 % v/v	B												
LSD P=.10					2								1	18.9

Means followed by same letter do not significantly differ.

Table 4. Comparisons of PRE/POST programs for control of common waterhemp in field corn at Rochester, MN in 2016.

Pest Code	AMATA					YIELD									
	Common waterhemp														
Pest Name						@15%									
Rating Date	May-24	May-31	Jun-6	Jun-13	Sep-13										
Trt Treatment	Rate	Appl	Percent Control (%)			BUu/A									
12 UNTREATED CHECK	0	e	0	c	0	b	0	d	0	c	2	e			
A = PRE 4-26-16															
1 SOA 14, 15, 27, 5			99	a	99	a	99	a	99	a	99	a	100	d	
ANTHEM MAX	4	fl oz/a	A												
BALANCE FLEX	2	fl oz/a	A												
ATRAZINE	1	qt/a	A												
2 SOA 5, 15, 27, ACURON	2.5	qt/a	A	99	a	99	a	99	a	99	a	187	ab		
3 SOA 2, 27 CORVUS	5.6	fl oz/a	A	99	a	99	a	99	a	97	c	95b	b	158	c
A/C = PRE 4-26-16 / POST II 5-24-16 (EAPOWE - 2 inch weeds)															
5 SOA 14, 15, 5 / 14, 27, 5, 9			99	a	99	a	99	a	99	a	99	a	199	ab	
ANTHEM MAX	4.5	fl oz/a	A												
ATRAZINE	1	qt/a	A												
SOLSTICE	2.5	fl oz/a	C												
ATRAZINE	1	pt/a	C												
ROUNDUP POWERMAX	32	fl oz/a	C												
Ammonium Sulfate	3.3	lb/100 gal	C												
6 SOA 14, 15 / 14, 27, 9			99	a	99	a	99	a	99	a	99	a	195	ab	
ANTHEM MAX	4.5	fl oz/a	A												
SOLSTICE	2.5	fl oz/a	C												
ROUNDUP POWERMAX	32	fl oz/a	C												
Ammonium Sulfate	3.3	lb/100 gal	C												
A/D = PRE 4-26-16 / POST III 6-2-16 (MPOWE - 2 to 3 inch weeds)															
4 SOA 14, 15 / 9			99	a	99	a	99	a	99	a	99	a	194	ab	
ANTHEM MAX	5	fl oz/a	A												
SHARPEN	2	fl oz/a	A												
ROUNDUP POWERMAX	32	fl oz/a	D												
Ammonium Sulfate	3.3	lb/100 gal	D												
7 SOA 14, 5 / 14, 15, 9			98	ab	98	b	99	a	99	a	99	a	202	ab	
SHARPEN	2	fl oz/a	A												
ATRAZINE	1	qt/a	A												
ANTHEM MAX	4	fl oz/a	D												
ROUNDUP POWERMAX	32	fl oz/a	D												
Ammonium Sulfate	3.3	lb/100 gal	D												
8 SOA 2, 4, 15 / 9			99	a	99	a	99	a	99	a	99	a	202	ab	
SURESTART II	2	pt/a	A												
ROUNDUP POWERMAX	32	fl oz/a	D												
Ammonium Sulfate	3.3	lb/100 gal	D												
B = POST I 5-20-16 (EAPOWE -1-2 inch weeds)															
9 SOA 15, 27, 9			35	c	99	a	99	a	99	a	99	a	188	ab	
ACURON FLEXI	2.25	qt/a	B												
ROUNDUP POWERMAX	32	fl oz/a	B												
Ammonium Sulfate	3.3	lb/100 gal	B												
10 SOA 14, 15, 27, 5, 9			96	b	99	a	99	a	99	a	99	a	206	a	
ANTHEM MAX	2	fl oz/a	B												
SOLSTICE	2.5	fl oz/a	B												
ATRAZINE	1	qt/a	B												
ROUNDUP POWERMAX	32	fl oz/a	B												
Ammonium Sulfate	3.3	lb/100 gal	B												
11 SOA 9, 15, 27			30	d	99	a	99	a	98	b	99	a	186	b	
HALEX GT	3.6	pt/a	B												
Ammonium Sulfate	3.3	lb/100 gal	B												
NIS	0.25	% v/v	B												
LSD P=.10			2		1		.		1		0.4		18.9		

Means followed by same letter do not significantly differ

Table 5. Comparisons of PRE/POST programs for control of grass species in field corn at Rochester, MN in 2016.

Pest Code	GRASS								YIELD
	Grangea sp.								
Pest Name									@15%
Rating Date	May-19	May-24	May-31	Jun-6	Jun-13	Sep-13			
Trt Treatment	Rate	Appl	Percent Control (%)						Bu/A
12 UNTREATED CHECK			0 b	0 e	0 c	0 c	0 c	0 d	2 e
A = PRE 4-26-16									
1 SOA 14, 15, 27, 5			99 a	99 a	99 a	99 a	99 a	99 a	100 d
ANTHEM MAX	4 fl oz/a	A							
BALANCE FLEX	2 fl oz/a	A							
ATRAZINE	1 qt/a	A							
2 SOA 5, 15, 27, ACURON	2.5 qt/a	A	99 a	99 a	99 a	99 a	99 a	99 a	187 ab
3 SOA 2, 27 CORVUS	5.6 fl oz/a	A	99 a	99 a	99 a	99 a	98 a	98 ab	158 c
A/C = PRE 4-26-16 / POST II 5-24-16 (EAPOWE - 2 inch weeds)									
5 SOA 14, 15, 5 / 14, 27, 5, 9			99 a	99 a	99 a	99 a	99 a	99 a	199 ab
ANTHEM MAX	4.5 fl oz/a	A							
ATRAZINE	1 qt/a	A							
SOLSTICE	2.5 fl oz/a	C							
ATRAZINE	1 pt/a	C							
ROUNDUP POWERMAX	32 fl oz/a	C							
Ammonium Sulfate	3.3 lb/100 gal	C							
6 SOA 14, 15 / 14, 27, 9			99 a	99 a	99 a	99 a	99 a	99 a	195 ab
ANTHEM MAX	4.5 fl oz/a	A							
SOLSTICE	2.5 fl oz/a	C							
ROUNDUP POWERMAX	32 fl oz/a	C							
Ammonium Sulfate	3.3 lb/100 gal	C							
A/D = PRE 4-26-16 / POST III 6-2-16 (MIPOWE - 2 to 3 inch weeds)									
4 SOA 14, 15 / 9			99 a	99 a	99 a	99 a	98 a	99 a	194 ab
ANTHEM MAX	5 fl oz/a	A							
SHARPEN	2 fl oz/a	A							
ROUNDUP POWERMAX	32 fl oz/a	D							
Ammonium Sulfate	3.3 lb/100 gal	D							
7 SOA 14, 5 / 14, 15, 9			99 a	93 b	83 b	97 b	95 b	97 bc	202 ab
SHARPEN	2 fl oz/a	A							
ATRAZINE	1 qt/a	A							
ANTHEM MAX	4 fl oz/a	D							
ROUNDUP POWERMAX	32 fl oz/a	D							
Ammonium Sulfate	3.3 lb/100 gal	D							
8 SOA 2,4,15 / 9			99 a	99 a	99 a	99 a	99 a	98 ab	202 ab
SURESTART II	2 pt/a	A							
ROUNDUP POWERMAX	32 fl oz/a	D							
Ammonium Sulfate	3.3 lb/100 gal	D							
B = POST I 5-20-16 (EAPOWE -1-2 inch weeds)									
9 SOA 15, 27, 9			0 b	33 c	99 a	99 a	99 a	99 a	188 ab
ACURON FLEXI	2.25 qt/a	B							
ROUNDUP POWERMAX	32 fl oz/a	B							
Ammonium Sulfate	3.3 lb/100 gal	B							
10 SOA 14, 15, 27, 5, 9			0 b	93 b	98 a	98 a	96 b	96 c	206 a
ANTHEM MAX	2 fl oz/a	B							
SOLSTICE	2.5 fl oz/a	B							
ATRAZINE	1 qt/a	B							
ROUNDUP POWERMAX	32 fl oz/a	B							
Ammonium Sulfate	3.3 lb/100 gal	B							
11 SOA 9, 15, 27			0 b	30 d	99 a	99 a	98 a	98 a	186 b
HALEX GT	3.6 pt/a	B							
Ammonium Sulfate	3.3 lb/100 gal	B							
NIS	0.25 % v/v	B							
LSD P=.10			.	3	3	1	2	2	18.9

Means followed by same letter do not significantly differ.

Table 6. Corn response to PRE/POST weed control programs at Rochester, MN, in 2016.

Pest Name				INJURY				YIELD				
Rating Date				May-19	May-24	May-31	Jun-6	@15%				
Trt	Treatment	Rate	Appl	Percent Injury (%)				BU/A				
12	UNTREATED CHECK			0	0	b	0	c	0	b	2	e
A = PRE 4-26-16												
1	SOA 14, 15, 27, 5			0	0	b	0	c	0	b	100	d
	ANTHEM MAX	4 fl oz/a	A									
	BALANCE FLEX	2 fl oz/a	A									
	ATRAZINE	1 qt/a	A									
2	SOA 5, 15, 27, ACURON	2.5 qt/a	A	0	0	b	0	c	0	b	187	ab
3	SOA 2, 27 CORVUS	5.6 fl oz/a	A	0	0	b	0	c	0	b	158	c
A/C = PRE 4-26-16 / POST II 5-24-16 (EAPOWE - 2 inch weeds)												
5	SOA 14, 15, 5 / 14, 27, 5, 9			0	0	b	2	b	2	b	199	ab
	ANTHEM MAX	4.5 fl oz/a	A									
	ATRAZINE	1 qt/a	A									
	SOLSTICE	2.5 fl oz/a	C									
	ATRAZINE	1 pt/a	C									
	ROUNDUP POWERMAX	32 fl oz/a	C									
	Ammonium Sulfate	3.3 lb/100 gal	C									
6	SOA 14, 15 / 14, 27, 9			0	0	b	0	c	0	b	195	ab
	ANTHEM MAX	4.5 fl oz/a	A									
	SOLSTICE	2.5 fl oz/a	C									
	ROUNDUP POWERMAX	32 fl oz/a	C									
	Ammonium Sulfate	3.3 lb/100 gal	C									
A/D = PRE 4-26-16 / POST III 6-2-16 (MPOWE - 2 to 3 inch weeds)												
4	SOA 14, 15 / 9			0	0	b	0	c	0	b	194	ab
	ANTHEM MAX	5 fl oz/a	A									
	SHARPEN	2 fl oz/a	A									
	ROUNDUP POWERMAX	32 fl oz/a	D									
	Ammonium Sulfate	3.3 lb/100 gal	D									
7	SOA 14, 5 / 14, 15, 9			0	0	b	0	c	7	a	202	ab
	SHARPEN	2 fl oz/a	A									
	ATRAZINE	1 qt/a	A									
	ANTHEM MAX	4 fl oz/a	D									
	ROUNDUP POWERMAX	32 fl oz/a	D									
	Ammonium Sulfate	3.3 lb/100 gal	D									
8	SOA 2,4,15 / 9			0	0	b	0	c	0	b	202	ab
	SURESTART II	2 pt/a	A									
	ROUNDUP POWERMAX	32 fl oz/a	D									
	Ammonium Sulfate	3.3 lb/100 gal	D									
B = POST I 5-20-16 (EAPOWE -1-2 inch weeds)												
9	SOA 15, 27, 9			0	0	b	0	c	0	b	188	ab
	ACURON FLEXI	2.25 qt/a	B									
	ROUNDUP POWERMAX	32 fl oz/a	B									
	Ammonium Sulfate	3.3 lb/100 gal	B									
10	SOA 14, 15, 27, 5, 9			0	13	a	5	a	0	b	206	a
	ANTHEM MAX	2 fl oz/a	B									
	SOLSTICE	2.5 fl oz/a	B									
	ATRAZINE	1 qt/a	B									
	ROUNDUP POWERMAX	32 fl oz/a	B									
	Ammonium Sulfate	3.3 lb/100 gal	B									
11	SOA 9, 15, 27			0	0	b	5	a	0	b	186	b
	HALEX GT	3.6 pt/a	B									
	Ammonium Sulfate	3.3 lb/100 gal	B									
	NIS	0.25 % v/v	B									
LSD P=.10					1		1		3		18.9	

Means followed by same letter do not significantly differ.