Evaluation of Preemergence and Postemergence Systems in Field Corn in 2012.

Breitenbach, Fritz R., Lisa M. Behnken, Ryan P. Miller, Steve Reiter, and Brent Breitenbach

The objective of this trial was to evaluate preemergence and postemergence systems for weed control in field corn in southeastern Minnesota. The research site was a Lawler loam series with a pH of 6.6, O.M. of 2.4%, and soil test P and K levels of 39 ppm and 113 ppm, respectively. Spring fertilizer was broadcast ahead of planting on March 30, 2012 at a rate of 135-26-150-24 (N-P-K-S). The field was spring disked and field cultivated once prior to planting. The corn hybrid, Pioneer P9917AM1 (99 day), was planted on April 26, 2012 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 20 GPA at 32 psi using Turbo Tee 11002 nozzles. Evaluations of the plots were taken on May 18, 29, June 4, 14 and August 8, 2012. The center two rows of each plot were machine harvested on October 2, 2012. Application dates, environmental conditions, and weed stages are listed below in Table 1. Herbicide performance for giant ragweed, common lambsquarters, common waterhemp and giant foxtail, plus plant injury ratings can be seen in Tables 2 through 6 respectively. (University of Minnesota Extension Regional Office – Rochester)

SUMMARY

Pre-emergent giant ragweed control varied by treatment and ranged from a high of 98 percent to low of 78 percent. Overall, these are impressive results for a difficult to control weed. Excellent control was achieved by four treatments Zemax at the 1.6 and 2 quart rate, Verdict, and the tank mixture of Anthem + Sharpen (98-97%, 5/18 rating). Very good control was achieved by the 1 quart rate of Zemax (96%, 5/18 rating). Good control was achieved from three treatments Anthem + Callisto, Anthem + Hornet, and Anthem + Stinger (91-90%, 5/18 rating). Fair control was achieved by the SureStart treatment (87%, 5/18 rating). The lowest level of control was obtained with the Anthem + Python tank mixture (78%, 5/18 rating).

Total post-emergent giant ragweed control also varied by treatment and ranged from a high of 99 percent to a low of 86 percent. Excellent control was achieved by two treatments Zemax + Touchdown Total and Anthem + Callisto + Touchdown Total (99 and 98%, 8/8 rating). Very good control was achieved by the tank mixture of Anthem + Touchdown Total + Status (96%, 8/8 rating date). Good control was achieved by the Anthem + Ignite 280 tank mixture (90%, 8/8 rating). The lowest level of post-emergent control was obtained with the Touchdown Total alone treatment (86%, 8/8 rating).

The most consistent common lambsquarters control was achieved from sequential PRE followed by POST I or POST II treatments and PRE only Zemax treatment (99-94%, 8/8 rating). POST only treatments provided more variable control (99-71%, 8/8 rating). All sequential PRE/POST treatments provided very good to excellent control. Two treatments were statistically lower, Anthem + Sharpen PRE followed by Touchdown Total treatment and Verdict PRE followed by Touchdown Total. Both of these treatments provided 94% control (8/8 rating). Two POST only treatments also provided statistically lower control, Anthem + Ignite 280 and Touchdown Total, 83% and 71%, respectively (8/8 rating).

All treatments, with the exception of the POST I Touchdown Total, (76%, 8/8 rating) provided excellent control of common waterhemp (98-99%, 8/8 rating).

Giant foxtail control was very consistent with the majority of the treatments providing excellent control (99-97%, 8/8 rating). Only the POST I applied Touchdown Total treatment provided slightly reduced control of giant foxtail (92%, 8/8 rating).

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

Date	**4/26**	**5/18**	**5/30**
Treatment	PRE	POST I	POST II
Temperature (F)			
Air	55	86	58
Soil	59	74	69
Relative Humidity (%)	36	25	51
Wind (mph)	13	24	12
Soil Moisture	Normal	Normal	Normal
Corn			
Stage		2-collar	V5-V6
Height (inch)		3.5	11.0
Giant Ragweed			
Weed density (ft^2)			6.4
Height (inch)		1.4	4.0
Common Lambsquarters			
Weed density (ft^2)			7.4
Height (inch)		0.8	
Common Waterhemp			
Weed density (ft^2)			6.3
Height (inch)		0.5	
Giant Foxtail			
Weed density (ft^2)			1.0
Height (inch)		2.0	
Rainfall after each application (inch)			
Week 1	1.28	0.91	0.08
Week 2	1.68	1.65	0.30
Week 3	0.00	0.08	2.87

Table 2. Evaluation of preemergence and postemergence systems for giant ragweed control in field corn on May 18, 29, June 4, 14 and August 8, at Rochester, MN, in 2012.

Treatment	Rate	Giant Ragweed Control					Yield
		5/18	5/29	6/4	6/14	8/8	
	(rate/A)	(%)					(bu/A)
Untreated Check		0	0	0	0	0	3
PRE							
Zemax	2 qt/a	98	97	97	97	97	116
PRE / POST I (1"-2" Weeds)							
Zemax / Halex + N-Pak-AMS + NIS	1 qt/a / 3.6 pt/a + 2.5% v/v + 0.25% v/v	94	98	99	99	99	115
PRE / POST II (V5-V6 Corn)							
Anthem + Sharpen / Touchdown Total + N-Pak-AMS	10 fl oz/a + 2 fl oz/a / 30 fl oz/a + 2.5% v/v	97	95	98	98	98	108
Anthem + Python / Touchdown Total + N-Pak-AMS	10 fl oz/a + 1 oz/a / 30 fl oz/a + 2.5% v/v	78	76	95	93	96	111
Anthem + Callisto / Touchdown Total + N-Pak-AMS	10 fl oz/a + 3 fl oz/a / 30 fl oz/a + 2.5% v/v	91	93	97	96	98	98
Anthem + Hornet / Touchdown Total + N-Pak-AMS	10 fl oz/a + 3 oz/a / 30 fl oz/a + 2.5% v/v	90	90	97	96	97	128
Anthem + Stinger / Touchdown Total + N-Pak-AMS	10 fl oz/a + 4 fl oz/a / 30 fl oz/a + 2.5% v/v	91	91	97	97	97	112
SureStart / Touchdown Total + N-Pak-AMS	1.5 pt/a / 30 fl oz/a + 2.5% v/v	87	84	96	93	96	132
Verdict / Touchdown Total + N-Pak-AMS	13 fl oz/a / 30 fl oz/a + 2.5% v/v	97	96	98	98	98	118
Zemax / Touchdown Total + N-Pak-AMS	1.6 qt/a / 30 fl oz/a + 2.5% v/v	96	97	98	97	98	109
POST I (1"-2" Weeds)							
Anthem + Callisto + Touchdown Total + N-Pak-AMS	8 fl oz/a + 3 fl oz/a + 30 fl oz/a + 2.5% v/v	0	98	98	98	98	123
Anthem + Ignite 280 + N-Pak-AMS	8 fl oz/a + 28 fl oz/a + 2.5% v/v	0	97	96	84	90	130
Anthem + Touchdown Total + Status + N-Pak-AMS	8 fl oz/a + 30 fl oz/a + 2.5 oz/a + 2.5% v/v	0	98	98	96	96	122
Touchdown Total + N-Pak-AMS	30 fl oz/a + 2.5%v/v	0	97	96	86	86	90
Zemax + Touchdown Total + N-Pak-AMS	1.6 qt/a + 30 fl oz/a + 2.5% v/v	0	98	98	99	99	109
	LSD (P=0.10)	**2.4**	**2.6**	**1.4**	**2.8**	**2.4**	**NS**

Table 3. Evaluation of preemergence and postemergence systems for common lambsquarters control in field corn on May 18, 29, June 4, 14 and August 8, at Rochester, MN, in 2012.

Treatment	Rate	Common Lambsquarters Control					Yield
		5/18	5/29	6/4	6/14	8/8	
	(rate/A)	(%)					(bu/A)
Untreated Check		0	0	0	0	0	3
PRE							
Zemax	2 qt/a	99	99	99	99	99	116
PRE / POST I (1"-2" Weeds)							
Zemax / Halex + N-Pak-AMS + NIS	1 qt/a / 3.6 pt/a + 2.5% v/v + 0.25% v/v	99	99	99	99	99	115
PRE / POST II (V5-V6 Corn)							
Anthem + Sharpen / Touchdown Total + N-Pak-AMS	10 fl oz/a + 2 fl oz/a / 30 fl oz/a + 2.5% v/v	99	98	99	99	94	108
Anthem + Python / Touchdown Total + N-Pak-AMS	10 fl oz/a + 1 oz/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	99	111
Anthem + Callisto / Touchdown Total + N-Pak-AMS	10 fl oz/a + 3 fl oz/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	98	98
Anthem + Hornet / Touchdown Total + N-Pak-AMS	10 fl oz/a + 3 oz/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	99	128
Anthem + Stinger / Touchdown Total + N-Pak-AMS	10 fl oz/a + 4 fl oz/a / 30 fl oz/a + 2.5% v/v	98	98	99	99	96	112
SureStart / Touchdown Total + N-Pak-AMS	1.5 pt/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	96	132
Verdict / Touchdown Total + N-Pak-AMS	13 fl oz/a / 30 fl oz/a + 2.5% v/v	99	98	99	99	94	118
Zemax / Touchdown Total + N-Pak-AMS	1.6 qt/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	98	109
POST I (1"-2" Weeds)							
Anthem + Callisto + Touchdown Total + N-Pak-AMS	8 fl oz/a + 3 fl oz/a + 30 fl oz/a + 2.5% v/v	0	99	99	99	99	123
Anthem + Ignite 280 + N-Pak-AMS	8 fl oz/a + 28 fl oz/a + 2.5% v/v	0	93	89	82	83	130
Anthem + Touchdown Total + Status + N-Pak-AMS	8 fl oz/a + 30 fl oz/a + 2.5 oz/a + 2.5% v/v	0	98	99	98	97	122
Touchdown Total + N-Pak-AMS	30 fl oz/a + 2.5%v/v	0	80	83	66	71	90
Zemax + Touchdown Total + N-Pak-AMS	1.6 qt/a + 30 fl oz/a + 2.5% v/v	0	93	99	99	98	109
	LSD (P=0.10)	**0.3**	**3.3**	**2.7**	**4.0**	**4.2**	**NS**

Table 4. Evaluation of preemergence and postemergence systems for common waterhemp control in field corn on May 18, 29, June 4, 14 and August 8, at Rochester, MN, in 2012.

Treatment	Rate	Common Waterhemp Control					Yield
		5/18	5/29	6/4	6/14	8/8	
	(rate/A)	(%)					(bu/A)
Untreated Check		0	0	0	0	0	3
PRE							
Zemax	2 qt/a	99	99	99	99	99	116
PRE / POST I (1”-2” Weeds)							
Zemax / Halex + N-Pak-AMS + NIS	1 qt/a / 3.6 pt/a + 2.5% v/v + 0.25% v/v	99	99	99	99	99	115
PRE / POST II (V5-V6 Corn)							
Anthem + Sharpen / Touchdown Total + N-Pak-AMS	10 fl oz/a + 2 fl oz/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	99	108
Anthem + Python / Touchdown Total + N-Pak-AMS	10 fl oz/a + 1 oz/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	99	111
Anthem + Callisto / Touchdown Total + N-Pak-AMS	10 fl oz/a + 3 fl oz/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	99	98
Anthem + Hornet / Touchdown Total + N-Pak-AMS	10 fl oz/a + 3 oz/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	99	128
Anthem + Stinger / Touchdown Total + N-Pak-AMS	10 fl oz/a + 4 fl oz/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	99	112
SureStart / Touchdown Total + N-Pak-AMS	1.5 pt/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	99	132
Verdict / Touchdown Total + N-Pak-AMS	13 fl oz/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	99	118
Zemax / Touchdown Total + N-Pak-AMS	1.6 qt/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	99	109
POST I (1”-2” Weeds)							
Anthem + Callisto + Touchdown Total + N-Pak-AMS	8 fl oz/a + 3 fl oz/a + 30 fl oz/a + 2.5% v/v	0	99	99	99	99	123
Anthem + Ignite 280 + N-Pak-AMS	8 fl oz/a + 28 fl oz/a + 2.5% v/v	0	98	98	96	99	130
Anthem + Touchdown Total + Status + N-Pak-AMS	8 fl oz/a + 30 fl oz/a + 2.5 oz/a + 2.5% v/v	0	99	99	98	98	122
Touchdown Total + N-Pak-AMS	30 fl oz/a + 2.5%v/v	0	98	96	70	76	90
Zemax + Touchdown Total + N-Pak-AMS	1.6 qt/a + 30 fl oz/a + 2.5% v/v	0	99	99	99	99	109
	LSD (P=0.10)	**NS**	**0.6**	**1.3**	**1.8**	**2.0**	**NS**

Table 5. Evaluation of preemergence and postemergence systems for giant foxtail control in field corn on May 18, 29, June 4, 14 and August 8, at Rochester, MN, in 2012.

Treatment	Rate	Giant Foxtail Control					Yield
		5/18	5/29	6/4	6/14	8/8	
	(rate/A)	(%)					(bu/A)
Untreated Check		0	0	0	0	0	3
PRE							
Zemax	2 qt/a	99	99	99	99	97	116
PRE / POST I (1”-2” Weeds)							
Zemax / Halex + N-Pak-AMS + NIS	1 qt/a / 3.6 pt/a + 2.5% v/v + 0.25% v/v	99	99	99	99	99	115
PRE / POST II (V5-V6 Corn)							
Anthem + Sharpen / Touchdown Total + N-Pak-AMS	10 fl oz/a + 2 fl oz/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	99	108
Anthem + Python / Touchdown Total + N-Pak-AMS	10 fl oz/a + 1 oz/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	99	111
Anthem + Callisto / Touchdown Total + N-Pak-AMS	10 fl oz/a + 3 fl oz/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	99	98
Anthem + Hornet / Touchdown Total + N-Pak-AMS	10 fl oz/a + 3 oz/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	98	128
Anthem + Stinger / Touchdown Total + N-Pak-AMS	10 fl oz/a + 4 fl oz/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	99	112
SureStart / Touchdown Total + N-Pak-AMS	1.5 pt/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	98	132
Verdict / Touchdown Total + N-Pak-AMS	13 fl oz/a / 30 fl oz/a + 2.5% v/v	99	99	99	99	98	118
Zemax / Touchdown Total + N-Pak-AMS	1.6 qt/a / 30 fl oz/a + 2.5% v/v	99	98	99	99	98	109
POST I (1”-2” Weeds)							
Anthem + Callisto + Touchdown Total + N-Pak-AMS	8 fl oz/a + 3 fl oz/a + 30 fl oz/a + 2.5% v/v	0	99	99	99	98	123
Anthem + Ignite 280 + N-Pak-AMS	8 fl oz/a + 28 fl oz/a + 2.5% v/v	0	99	99	98	97	130
Anthem + Touchdown Total + Status + N-Pak-AMS	8 fl oz/a + 30 fl oz/a + 2.5 oz/a + 2.5% v/v	0	99	99	99	98	122
Touchdown Total + N-Pak-AMS	30 fl oz/a + 2.5%v/v	0	99	97	94	92	90
Zemax + Touchdown Total + N-Pak-AMS	1.6 qt/a + 30 fl oz/a + 2.5% v/v	0	99	99	99	99	109
	LSD (P=0.10)	**NS**	**0.7**	**0.4**	**1.4**	**1.9**	**NS**

Table 6. Crop response to preemergence and postemergence systems in field corn on May 18, 29, and June 18 at Rochester, MN, in 2012.

Treatment	Rate	Crop Injury 5/18	Crop Injury 5/29	Plant Height 6/18	Yield
	(rate/A)	(%)		(in)	(bu/A)
Untreated Check		0	0	24.8	3
PRE					
Zemax	2 qt/a	0	0	48.3	116
PRE / POST I (1"-2" Weeds)					
Zemax / Halex + N-Pak-AMS + NIS	1 qt/a / 3.6 pt/a + 2.5% v/v + 0.25% v/v	0	0	47.3	115
PRE / POST II (V5-V6 Corn)					
Anthem + Sharpen / Touchdown Total + N-Pak-AMS	10 fl oz/a + 2 fl oz/a / 30 fl oz/a + 2.5% v/v	0	0	44.8	108
Anthem + Python / Touchdown Total + N-Pak-AMS	10 fl oz/a + 1 oz/a / 30 fl oz/a + 2.5% v/v	0	0	43.5	111
Anthem + Callisto / Touchdown Total + N-Pak-AMS	10 fl oz/a + 3 fl oz/a / 30 fl oz/a + 2.5% v/v	0	0	46.5	98
Anthem + Hornet / Touchdown Total + N-Pak-AMS	10 fl oz/a + 3 oz/a / 30 fl oz/a + 2.5% v/v	0	0	47.0	128
Anthem + Stinger / Touchdown Total + N-Pak-AMS	10 fl oz/a + 4 fl oz/a / 30 fl oz/a + 2.5% v/v	0	0	45.8	112
SureStart / Touchdown Total + N-Pak-AMS	1.5 pt/a / 30 fl oz/a + 2.5% v/v	0	0	45.3	132
Verdict / Touchdown Total + N-Pak-AMS	13 fl oz/a / 30 fl oz/a + 2.5% v/v	0	0	49.5	118
Zemax / Touchdown Total + N-Pak-AMS	1.6 qt/a / 30 fl oz/a + 2.5% v/v	0	0	45.5	109
POST I (1"-2" Weeds)					
Anthem + Callisto + Touchdown Total + N-Pak-AMS	8 fl oz/a + 3 fl oz/a + 30 fl oz/a + 2.5% v/v	0	15	44.3	123
Anthem + Ignite 280 + N-Pak-AMS	8 fl oz/a + 28 fl oz/a + 2.5% v/v	0	20	44.3	130
Anthem + Touchdown Total + Status + N-Pak-AMS	8 fl oz/a + 30 fl oz/a + 2.5 oz/a + 2.5% v/v	0	15	41.3	122
Touchdown Total + N-Pak-AMS	30 fl oz/a + 2.5%v/v	0	0	46.8	90
Zemax + Touchdown Total + N-Pak-AMS	1.6 qt/a + 30 fl oz/a + 2.5% v/v	0	0	49.8	109
	LSD (P=0.10)	**0**	**0**	**5.3**	**NS**