

Evaluation of weed management systems in field corn at Rochester, MN, in 2007.

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The objective of this trial was to evaluate herbicide systems for weed control in field corn in southeastern Minnesota. The research site was a Lawler loam series with a pH of 6.9 and soil test P and K levels of 31 ppm and 132 ppm, respectively. Spring fertilizer was broadcast ahead of planting on April 13, at a rate of 99-23-60-24 (N-P-K-S). The area was side dressed with an additional 30 lb/A of N on June 7. The field was spring disked twice and field cultivated once prior to planting. The corn hybrid, NK N38B4, was planted on May 3, 2007, at a depth of 1.5 inches in 30 inch rows at 32,000 seeds per acre. A randomized complete block design was used with four replications. Preemergence (PRE) and postemergence (POST I, POST II, POST III, POST IV) 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 22, June 4, June 11, June 21, July 2, and August 8. Application dates, environmental conditions, and weed stages are listed below. The center two rows of each plot were machine harvested on September 26, 2007.

Date	May 3	May 19	May 23	June 1	June 12
Treatment	PRE	POST I	POST II	POST III	POST IV
Temperature (F)					
Air	69	77	72	70	84
soil	64.4	--	69.4	68.9	81.3
Relative Humidity (%)	47	35	68	70	36
Wind (mph)	15	24	23	12	12
Soil moisture	adequate	inadequate	excessive	excessive	dry
Corn					
stage	--	2 collar	3 collar	5 collar	7 collar
height (inch)	--	3.0	4.5	9.5	22.0
Velvetleaf					
weed density (ft ²)	--	3.5	3.5	3.5	3.5
height (inch)	--	0.8	1.0	2.9	2.5
Common Lambsquarters					
weed density (ft ²)	--	33.6	33.6	33.6	33.6
height (inch)	--	0.8	1.1	3.8	2.5
Common Waterhemp					
weed density (ft ²)	--	16.4	16.4	16.4	16.4
height (inch)	--	0.5	0.7	2.0	2.5
Giant Foxtail					
weed density (ft ²)	--	98.5	98.5	98.5	98.5
height (inch)	--	0.8	1.2	4.4	2.5
Rainfall after each application (inch)					
week 1	0.52	2.41	2.04	0.44	1.40
week 2	0.34	1.25	1.28	0.00	2.03
week 3	1.35	0.44	0.38	2.97	0.06

CONCLUSIONS

All conclusions are based on the final ratings taken on August 8, 2007. Crop injury was not observed throughout the duration of this trial.

Giant Foxtail Control

The highest rated treatment for giant foxtail control was the Lumax 3 pt/A applied PRE followed by Touchdown Total 24 oz/A applied POST III. Nine additional treatments provided statistically equal control. Seven out the ten highest rated herbicide programs were glyphosate based weed control programs. Two were Liberty based programs and one was a true conventional program. Nine out of the ten programs were sequential weed control programs. Eight of the ten utilized a pre-emergent herbicide followed by a post-emergence herbicide. The other sequential program was a two-pass post-emergence program with Roundup WeatherMax. Halex GT was the only single-pass herbicide program in the high category for giant foxtail control.

Velvetleaf Control

The highest rated treatment for velvetleaf control was Dual II Magnum 32 oz/A trazine 16 oz/A applied POST III. Six additional treatments

provided statistically equal control. Four out of the seven best programs utilized a sequential PRE/POST program. Two of the seven utilized a single-pass POST only strategy, both of which utilized glyphosate tank mixed with a residual herbicide as a component of the tank mix. One of the seven was the two-pass Roundup WeatherMax program.

Common Waterhemp Control

A number of programs tied as the highest rated treatments for waterhemp control. In this trial with waterhemp, it will be easier to talk about which herbicide programs did not provide maximum waterhemp control. Six treatments provided statistically lower common waterhemp control. All of the one-pass POST II herbicide programs provided lower waterhemp control. In addition, three PRE/POST sequential programs provided statistically lower control. Define SC 12 oz/A PRE followed by Liberty 32 oz/A + atrazine 16 oz applied POST III, Define SC 12 oz/A PRE followed by Laudis 3 oz/A applied POST III, and Resolve 1 oz/A + atrazine 24 oz/A PRE followed by Roundup Original Max 22 oz/A applied POST III.

Common Lambsquarters Control

All herbicide programs with the exception of three provided excellent common lambsquarters control. The three programs which failed to provide maximum lambsquarters control were Harness 1.25 pt/A PRE followed by Roundup WeatherMax 22 oz/A applied POST III, Resolve 1 oz/A + atrazine 24 oz/A PRE followed by Roundup Original Max 22 oz/A applied POST III, and the sequential Roundup WeatherMax 22 oz/A POST II followed by Roundup WeatherMax 22 oz/A applied POST IV. (University of Minnesota Extension Regional Center, Rochester, MN)

Table 1. Performance of herbicide systems for giant foxtail control in field corn on May 22, June 4, June 11, June 21, July 2, and August 8 at Rochester, MN, in 2007.

Treatment	Rate	Giant Foxtail Control						Yield
		5/22	6/4	6/11	6/21	7/2	8/8	
	(rate/A)	(%)						(bu/A)
PRE								
Keystone LA + Hornet WDG	2.2 qt + 4 oz	48	79	80	75	75	73	38
PRE / POST III								
Breakfree / Stout + Impact + atrazine + COC + N-Pa-K AMS	1.0 pt / 0.5 oz + 0.5 oz + 16 oz + 1% v/v + 3 qt	28	28	91	92	93	89	91
Outlook / Status + NIS + N-Pa-K AMS	21 oz / 5 oz + 0.25% v/v + 3 qt	25	25	84	89	91	85	67
Define SC / Liberty + atrazine + N-Pa-K AMS	12 oz / 32 oz + 16 oz + 3.5 qt	25	25	96	96	96	92	84
Define SC / Option + Distinct + MSO + 28%N	12 oz / 1.5 oz + 2 oz + 1.5 pt + 1.5 qt	25	25	87	94	94	92	75
Define SC / Laudis + MSO + 28%N	12 oz / 3 oz + 1.5 pt + 1.5 qt	25	25	86	78	78	79	64
Breakfree / New Resolve + Roundup Original Max + NIS + N-Pa-K AMS	1 pt / 1.25 oz + 22 oz + 0.25% v/v + 3 qt	28	28	99	97	98	95	81
Dual II Magnum / Callisto + atrazine + COC + 28%N	1 qt / 3 oz + 16 oz + 1% v/v + 2.5% v/v	33	33	87	76	79	77	53
Harness / Roundup Weather Max + N-Pa-K AMS	1.25 pt / 22 oz + 3 qt	36	36	98	96	98	93	86
Lumax / Touchdown Total + N-Pa-K AMS	3 pt / 24 oz + 3 qt	30	81	99	99	98	96	87
Lumax / Liberty + N-Pa-K AMS	3 pt / 24 oz + 3 qt	30	89	98	98	97	95	71
Sure Start / Durango + N-Pa-K AMS	1.75 pt / 24 oz + 3 qt	23	23	98	93	93	84	96
Outlook / Roundup Weather Max + Status + N-Pa-K AMS	12 oz / 22 oz + 2.5 oz + 3 qt	25	25	99	97	97	95	72
Resolve + atrazine / Roundup Original Max + NIS + N-Pa-K AMS	1 oz + 24 oz / 22 oz + 0.25% v/v + 3 qt	27	27	95	95	92	90	72
Breakfree / Impact + atrazine + MSO + 28%N	2 pt / 0.5 oz + 16 oz + 1% v/v + 2.5% v/v	30	30	92	87	88	88	70
Harness / Impact + atrazine + Roundup Weather Max + N-Pa-K AMS	1.25 pt / 0.5 oz + 16 oz + 22 oz + 3 qt	27	27	98	93	96	95	61
POST I / POST IV								
Roundup Weather Max + N-Pa-K AMS / Roundup Weather Max + N-Pa-K AMS	22 oz + 3 qt / 22 oz + 3 qt	0	78	60	93	98	94	88
POST I								
Sure Start + Durango + N-Pa-K AMS	1.75 pt + 24 oz + 3 qt	0	97	96	94	93	89	62
Halex GT + atrazine + NIS + N-Pa-K AMS	4 pt + 16 oz + 0.25% v/v + 3 qt	0	98	98	99	98	95	50
POST II								
Steadfast + Impact + atrazine + MSO + N-Pa-K AMS	0.75 oz + 0.5 oz + 16 oz + 1% v/v + 3 qt	0	88	91	91	91	87	57
Steadfast + Status + atrazine + MSO + N-Pa-K AMS	0.75 oz + 2.5 oz + 16 oz + 1% v/v + 3 qt	0	82	87	84	83	79	62
New Resolve + atrazine + Roundup Original Max + NIS + N-Pa-K AMS	1.25 oz + 16 oz + 22 oz + 0.25 % v/v + 3 qt	0	84	89	92	87	83	53
Weedy		0	0	0	0	0	0	18
Weed Free		100	100	100	100	100	100	79
LSD (P=0.10)		9	7	3	5	4	5	30

Table 2. Performance of herbicide systems for velvetleaf control in field corn on May 22, June 4, June 11, June 21, July 2, and August 8 at Rochester, MN, in 2007.

Treatment	Rate	Velvetleaf Control						Yield
		5/22	6/4	6/11	6/21	7/2	8/8	
	(rate/A)	(%)						(bu/A)
PRE								
Keystone LA + Hornet WDG	2.2 qt + 4 oz	33	81	80	77	94	86	38
PRE / POST III								
Breakfree / Stout + Impact + atrazine + COC + N-Pa-K AMS	1.0 pt / 0.5 oz + 0.5 oz + 16 oz + 1% v/v + 3 qt	25	25	94	90	96	87	91
Outlook / Status + NIS + N-Pa-K AMS	21 oz / 5 oz + 0.25% v/v + 3 qt	25	25	66	86	96	91	67
Define SC / Liberty + atrazine + N-Pa-K AMS	12 oz / 32 oz + 16 oz + 3.5 qt	23	23	95	94	94	84	84
Define SC / Option + Distinct + MSO + 28%N	12 oz / 1.5 oz + 2 oz + 1.5 pt + 1.5 qt	25	25	75	95	95	89	75
Define SC / Laudis + MSO + 28%N	12 oz / 3 oz + 1.5 pt + 1.5 qt	25	25	84	93	96	88	64
BreakFree / New Resolve + Roundup Original Max + NIS + N-Pa-K AMS	1 pt / 1.25 oz + 22 oz + 0.25% v/v + 3 qt	23	23	96	91	93	85	81
Dual II Magnum / Callisto + atrazine + COC + 28%N	1 qt / 3 oz + 16 oz + 1% v/v + 2.5% v/v	25	25	99	99	99	99	53
Harness / Roundup Weather Max + N-Pa-K AMS	1.25 pt / 22 oz + 3 qt	23	23	95	92	94	84	86
Lumax / Touchdown Total + N-Pa-K AMS	3 pt / 24 oz + 3 qt	25	97	99	99	98	97	87
Lumax / Liberty + N-Pa-K AMS	3 pt / 24 oz + 3 qt	25	99	98	98	98	98	71
Sure Start / Durango + N-Pa-K AMS	1.75 pt / 24 oz + 3 qt	25	25	98	94	96	91	96
Outlook / Roundup Weather Max + Status + N-Pa-K AMS	12 oz / 22 oz + 2.5 oz + 3 qt	30	30	96	97	95	90	72
Resolve + atrazine / Roundup Original Max + NIS + N-Pa-K AMS	1 oz + 24 oz / 22 oz + 0.25% v/v + 3 qt	20	20	92	91	91	87	72
Breakfree / Impact + atrazine + MSO + 28%N	2 pt / 0.5 oz + 16 oz + 1% v/v + 2.5% v/v	20	20	92	90	93	90	70
Harness / Impact + atrazine + Roundup Weather Max + N-Pa-K AMS	1.25 pt / 0.5 oz + 16 oz + 22 oz + 3 qt	20	20	98	97	96	97	61
POST I / POST IV								
Roundup Weather Max + N-Pa-K AMS / Roundup Weather Max + N-Pa-K AMS	22 oz + 3 qt / 22 oz + 3 qt	0	78	55	84	97	95	88
POST I								
Sure Start + Durango + N-Pa-K AMS	1.75 pt + 24 oz + 3 qt	0	91	95	96	96	94	62
Halex GT + atrazine + NIS + N-Pa-K AMS	4 pt + 16 oz + 0.25% v/v + 3 qt	0	98	99	99	97	98	50
POST II								
Steadfast + Impact + atrazine + MSO + N-Pa-K AMS	0.75 oz + 0.5 oz + 16 oz + 1% v/v + 3 qt	0	89	93	90	92	89	57
Steadfast + Status + atrazine + MSO + N-Pa-K AMS	0.75 oz + 2.5 oz + 16 oz + 1% v/v + 3 qt	0	90	94	92	93	88	62
New Resolve + atrazine + Roundup Original Max + NIS + N-Pa-K AMS	1.25 oz + 16 oz + 22 oz + 0.25 % v/v + 3 qt	0	91	93	91	93	84	53
Weedy		0	0	0	0	0	0	18
Weed Free		100	100	100	100	100	100	79
LSD (P=0.10)		7	7	4	3	3	6	30

Table 3. Performance of herbicide systems for common waterhemp control in field corn on May 22, June 4, June 11, June 21, July 2, and August 8 at Rochester, MN, in 2007.

Treatment	Rate (rate/A)	Common Waterhemp Control (%)						Yield (bu/A)
		5/22	6/4	6/11	6/21	7/2	8/8	
PRE								
Keystone LA + Hornet WDG	2.2 qt + 4 oz	88	99	99	99	99	98	38
PRE / POST III								
Breakfree / Stout + Impact + atrazine + COC + N-Pa-K AMS	1.0 pt / 0.5 oz + 0.5 oz + 16 oz + 1% v/v + 3 qt	56	56	99	99	98	99	91
Outlook / Status + NIS + N-Pa-K AMS	21 oz / 5 oz + 0.25% v/v + 3 qt	40	40	87	92	96	99	67
Define SC / Liberty + atrazine + N-Pa-K AMS	12 oz / 32 oz + 16 oz + 3.5 qt	23	23	98	97	95	94	84
Define SC / Option + Distinct + MSO + 28%N	12 oz / 1.5 oz + 2 oz + 1.5 pt + 1.5 qt	20	20	87	97	97	98	75
Define SC / Laudis + MSO + 28%N	12 oz / 3 oz + 1.5 pt + 1.5 qt	20	20	88	89	83	91	64
BreakFree / New Resolve + Roundup Original Max + NIS + N-Pa-K AMS	1 pt / 1.25 oz + 22 oz + 0.25% v/v + 3 qt	35	35	99	99	99	99	81
Dual II Magnum / Callisto + atrazine + COC + 28%N	1 qt / 3 oz + 16 oz + 1% v/v + 2.5% v/v	50	50	99	99	99	99	53
Harness / Roundup Weather Max + N-Pa-K AMS	1.25 pt / 22 oz + 3 qt	58	58	99	97	98	99	86
Lumax / Touchdown Total + N-Pa-K AMS	3 pt / 24 oz + 3 qt	65	99	99	99	99	99	87
Lumax / Liberty + N-Pa-K AMS	3 pt / 24 oz + 3 qt	45	99	99	99	99	99	71
Sure Start / Durango + N-Pa-K AMS	1.75 pt / 24 oz + 3 qt	55	55	99	99	98	97	96
Outlook / Roundup Weather Max + Status + N-Pa-K AMS	12 oz / 22 oz + 2.5 oz + 3 qt	20	20	99	99	99	98	72
Resolve + atrazine / Roundup Original Max + NIS + N-Pa-K AMS	1 oz + 24 oz / 22 oz + 0.25% v/v + 3 qt	23	23	99	99	98	95	72
Breakfree / Impact + atrazine + MSO + 28%N	2 pt / 0.5 oz + 16 oz + 1% v/v + 2.5% v/v	78	78	97	98	98	97	70
Harness / Impact + atrazine + Roundup Weather Max + N-Pa-K AMS	1.25 pt / 0.5 oz + 16 oz + 22 oz + 3 qt	73	73	99	99	99	99	61
POST I / POST IV								
Roundup Weather Max + N-Pa-K AMS / Roundup Weather Max + N-Pa-K AMS	22 oz + 3 qt / 22 oz + 3 qt	0	83	69	99	98	98	88
POST I								
Sure Start + Durango + N-Pa-K AMS	1.75 pt + 24 oz + 3 qt	0	99	99	99	99	99	62
Halex GT + atrazine + NIS + N-Pa-K AMS	4 pt + 16 oz + 0.25% v/v + 3 qt	0	99	99	99	99	99	50
POST II								
Steadfast + Impact + atrazine + MSO + N-Pa-K AMS	0.75 oz + 0.5 oz + 16 oz + 1% v/v + 3 qt	0	99	99	97	91	95	57
Steadfast + Status + atrazine + MSO + N-Pa-K AMS	0.75 oz + 2.5 oz + 16 oz + 1% v/v + 3 qt	0	99	98	93	90	93	62
New Resolve + atrazine + Roundup Original Max + NIS + N-Pa-K AMS	1.25 oz + 16 oz + 22 oz + 0.25 % v/v + 3 qt	0	99	99	96	95	92	53
Weedy		0	0	0	0	0	0	18
Weed Free		100	100	100	100	100	100	79
LSD (P=0.10)		15	13	6	2	3	3	30

Table 4. Performance of herbicide systems for common lambsquarters control in field corn on May 22, June 4, June 11, June 21, July 2, and August 8 at Rochester, MN, in 2007.

Treatment	Rate (rate/A)	Common Lambsquarters Control (%)						Yield (bu/A)
		5/22	6/4	6/11	6/21	7/2	8/8	
PRE								
Keystone LA + Hornet WDG	2.2 qt + 4 oz	71	99	99	99	100	96	38
PRE / POST III								
Breakfree / Stout + Impact + atrazine + COC + N-Pa-K AMS	1.0 pt / 0.5 oz + 0.5 oz + 16 oz + 1% v/v + 3 qt	23	23	96	98	100	99	91
Outlook / Status + NIS + N-Pa-K AMS	21 oz / 5 oz + 0.25% v/v + 3 qt	23	23	68	98	100	99	67
Define SC / Liberty + atrazine + N-Pa-K AMS	12 oz / 32 oz + 16 oz + 3.5 qt	20	20	97	96	99	97	84
Define SC / Option + Distinct + MSO + 28%N	12 oz / 1.5 oz + 2 oz + 1.5 pt + 1.5 qt	20	20	71	93	99	98	75
Define SC / Laudis + MSO + 28%N	12 oz / 3 oz + 1.5 pt + 1.5 qt	20	20	73	99	99	99	64
BreakFree / New Resolve + Roundup Original Max + NIS + N-Pa-K AMS	1 pt / 1.25 oz + 22 oz + 0.25% v/v + 3 qt	23	23	97	97	98	96	81
Dual II Magnum / Callisto + atrazine + COC + 28%N	1 qt / 3 oz + 16 oz + 1% v/v + 2.5% v/v	24	24	97	99	100	99	53
Harness / Roundup Weather Max + N-Pa-K AMS	1.25 pt / 22 oz + 3 qt	38	38	95	82	89	82	86
Lumax / Touchdown Total + N-Pa-K AMS	3 pt / 24 oz + 3 qt	34	98	99	99	100	99	87
Lumax / Liberty + N-Pa-K AMS	3 pt / 24 oz + 3 qt	33	99	99	99	99	99	71
Sure Start / Durango + N-Pa-K AMS	1.75 pt / 24 oz + 3 qt	40	40	96	97	98	97	96
Outlook / Roundup Weather Max + Status + N-Pa-K AMS	12 oz / 22 oz + 2.5 oz + 3 qt	25	25	97	96	98	97	72
Resolve + atrazine / Roundup Original Max + NIS + N-Pa-K AMS	1 oz + 24 oz / 22 oz + 0.25% v/v + 3 qt	23	23	96	94	97	93	72
Breakfree / Impact + atrazine + MSO + 28%N	2 pt / 0.5 oz + 16 oz + 1% v/v + 2.5% v/v	34	34	96	98	99	97	70
Harness / Impact + atrazine + Roundup Weather Max + N-Pa-K AMS	1.25 pt / 0.5 oz + 16 oz + 22 oz + 3 qt	40	40	99	99	99	98	61
POST I / POST IV								
Roundup Weather Max + N-Pa-K AMS / Roundup Weather Max + N-Pa-K AMS	22 oz + 3 qt / 22 oz + 3 qt	0	83	70	74	94	90	88
POST I								
Sure Start + Durango + N-Pa-K AMS	1.75 pt + 24 oz + 3 qt	0	99	98	96	98	96	62
Halex GT + atrazine + NIS + N-Pa-K AMS	4 pt + 16 oz + 0.25% v/v + 3 qt	0	99	99	99	100	99	50
POST II								
Steadfast + Impact + atrazine + MSO + N-Pa-K AMS	0.75 oz + 0.5 oz + 16 oz + 1% v/v + 3 qt	0	99	99	99	100	99	57
Steadfast + Status + atrazine + MSO + N-Pa-K AMS	0.75 oz + 2.5 oz + 16 oz + 1% v/v + 3 qt	0	99	99	99	100	99	62
New Resolve + atrazine + Roundup Original Max + NIS + N-Pa-K AMS	1.25 oz + 16 oz + 22 oz + 0.25 % v/v + 3 qt	0	99	99	99	100	99	53
Weedy		0	0	0	0	0	0	18
Weed Free		100	100	100	100	100	100	79
LSD (P=0.10)		9	8	4	4	3	3	30