Evaluation of application timings of mesotrione and glyphosate based systems in field corn at Rochester, MN in 2005. Breitenbach, Fritz R., Lisa M. Behnken, Corey W. Stever, and Krista M. Sheehan. The objective of this trial was to evaluate and compare the performance of mesotrione and glyphosate based programs for weed control in field corn in southeastern Minnesota. The research site was a Lawler series loam containing 2.4% organic matter with a pH test of 7.4 and soil test P and K levels of 52 ppm and 168 ppm, respectively. The previous crop was soybean. The area was fertilized in the spring with 130 lb/A nitrogen, 23 lb/A phosphorus, 90 lb/A potash, and 13 lb/A sulfur. The area was top dressed with 40 lb/A of nitrogen on June 7, 2005. The field was disked and field cultivated prior to planting. The corn hybrid, DeKalb DKC 51-45RR, was planted on April 29, 2005 at a depth of 1.5 inches in 30-inch rows at 32,000 seeds/A. A randomized complete block design with four replications was used. Preemergence (PRE) and postemergence (POST I, POST II, POST III, and 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 20, May 26, June 15 and June 24. Application dates, environmental conditions, and crop and weed stages are listed below.

Date	April 29	May 24	June 2	June 6	June 16
Treatment	PRE	POST I	POST II	POST III	POST IV
Temperature (F)					
air	49	73	68	79	73
soil	50	--	68	80	65
Relative humidity (%)	33	44	58	46	44
Wind (mph)	6	8	14	14	6
Soil moisture	dry	adequate	adequate	dry/adequate	adequate
Corn					
stage	Seeded	LS2	V3 collar	3-4 collar	6 collar
height (inch)	--	2.5	4.8	7.1	15
Giant ragweed					
weed density (ft^2)	--	15.9	15.9	15.9	15.9
height (inch)	--	2.4	5.5	10.5	3.8
Common waterhemp					
weed density (ft^2)	--	116	116	116	116
height (inch)	--	0.2	0.8	1.0	2.5
Common lambsquarters					
weed density (ft^2)	--	1.0	1.0	1.0	1.0
height (inch)	--	0.6	2.0	2.4	1.5
Giant foxtail					
weed density (ft^2)	--	1.1	1.1	1.1	1.1
height (inch)	--	0.4	1.5	2.0	1.1
Rainfall after application (inch)					
week 1	0.12	0.31	1.82	2.06	0.15
week 2	1.65	1.45	0.54	0.19	1.23
week 3	0.31	0.25	0.15	1.29	0.07

The five preemergence treatments afforded very good weed control across the spectrum of weeds evaluated in this trial. Early season differences (reduced control) were observed for KIH-485 + flumetsulam & clopyralid for giant ragweed, however, no differences were measurable during later ratings.

PRE/POST I treatments consisted of split applications of s-metolachlor & atrazine & mesotrione & benoxacor[1] and s-metolachlor & mesotrione & benoxacor. Both of these treatments provided very good weed control as measured by the final weed rating. However, the s-metolachlor & atrazine & mesotrione & benoxacor[1] split treatment provided better early season giant ragweed control.

PRE/POST II treatments consisted of reduced rates of soil applied herbicides followed by glyphosate, compared to s-metolachlor & benoxacor followed by mesotrione + atrazine. Soil applied products with atrazine or mesotrione provided some suppression of giant ragweed. The soil applied product with the

highest atrazine component provided the best early season giant ragweed control. The s-metolachlor & benoxacor / mesotrione & atrazine treatment provided the best late season giant ragweed control. Significantly reduced common waterhemp control was observed in the acetochlor & atrazine & MON 4660 / glyphosate treatment for the last two ratings.

POST I treatments consisted of reduced rates of s-metolachlor & atrazine & mesotrione & benoxacor[1 & 2] and s-metolachlor & mesotrione & benoxacor (applied for residual control) tank mixed with glyphosate[3]. The above three treatments were compared to a POST I only application of glyphosate[4]. Excellent weed control was achieved with the residual products tank mixed with glyphosate[3.] The glyphosate[4] only treatment applied at POST I provided significantly reduced control of giant ragweed, common waterhemp, and giant foxtail.

Glyphosate[4] only applications were also made POST II, POST III, and sequentially at POST IV. The POST IV sequential applications provided the most consistent weed control. POST III applications provided the next highest weed control; however, a slight reduction in giant ragweed control was observed and dramatically reduced common waterhemp control was evident. POST II applications also resulted in significantly lower giant ragweed and common waterhemp control when compared to the sequential applications of glyphosate[4]. POST I applications provided significantly reduced control of giant ragweed, common waterhemp, and giant foxtail when compared to all other application timings with glyphosate[4]. (University of Minnesota Extension Service, Regional Center, Rochester, MN)

Table. Performance of mesotrione and glyphosate systems for weed control in corn on May 20, May 26, June 15 and June 24 at Rochester, MN in 2005. (Breitenbach, Behnken, Stever, and Sheehan).

Treatment[a]	Rate	AMBTR control				CHEAL control			AMATA control			SETFA control			Corn yield[b]
		5/20	5/26	6/15	6/24	5/26	6/15	6/24	5/26	6/15	6/24	5/26	6/15	6/24	
	(lb/A)	(%)				(%)			(%)			(%)			(bu/A)
PRE															
S-metolachlor& atrazine&mesotrione& benoxacor[1]	1.67 & 0.63 & 0.17	60	75	93	94	99	99	99	99	99	99	99	95	97	198
S-metolachlor& atrazine&mesotrione& benoxacor[2]	1.3 &1.3 & 0.17	71	79	96	95	99	99	99	99	99	99	99	96	97	179
Acetochlor&atrazine& dichlormid + flumetsulam& clopyralid	1.99 & 0.75 + 0.035 & 0.09	78	85	91	89	99	99	99	99	97	98	99	96	97	161
KIH-485 + mesotrione	0.19 + 0.16	34	68	90	93	99	99	99	99	99	99	99	97	99	174
KIH-485 + flumetsulam& clopyralid	0.19 + 0.035 & 0.09	64	65	86	90	99	99	99	99	99	99	99	97	97	172
PRE / POST I															
S-metolachlor& atrazine&mesotrione& benoxacor[1] / s-metolachlor& atrazine&mesotrione& benoxacor[1] + NIS	0.83 & 0.31 & 0.08 / 0.83 & 0.31 & 0.08+ 0.25%	34	63	97	98	99	99	99	99	99	99	99	98	99	212
S-metolachlor& mesotrione& benoxacor / s-metolachlor& mesotrione& benoxacor + NIS	0.84 & 0.08 / 0.84 & 0.08+ 0.25%	15	59	95	96	99	99	99	99	99	99	97	97	98	192

Treatment[a]	Rate	AMBTR control				CHEAL control			AMATA control			SETFA control			Corn yield[b]
		5/20	5/26	6/15	6/24	5/26	6/15	6/24	5/26	6/15	6/24	5/26	6/15	6/24	
	(lb/A)	(%)				(%)			(%)			(%)			(bu/A)
PRE / POST II															
S-metolachlor &mesotrione& benoxacor / glyphosate[3] + AMS	1.0 & 0.10 / 0.78 + 3	18	56	89	90	99	99	99	99	99	98	99	99	98	187
S-metolachlor& atrazine&mesotrione& benoxacor[1] / glyphosate[3] + AMS	1.0 & 0.38 & 0.10 / 0.78 + 3	39	64	91	88	99	99	99	99	99	99	99	98	96	202
S-metolachlor& atrazine&mesotrione& benoxacor[2] / glyphosate[3] + AMS	0.76 & 0.76 & 0.1 / 0.78 + 3	55	71	94	90	99	99	99	99	99	96	99	97	98	203
S-metolachlor& benoxacor / mesotrione + atrazine + COC + 28 % UAN	1.3 / 0.09 + 0.5 + 1% + 2.5%	0	0	97	99	70	99	99	99	99	99	97	98	98	212
Acetochlor&atrazine& MON 4660 / glyphosate[4] + AMS	0.84 & 0.66 / 0.77 + 3	23	25	84	87	86	99	99	97	75	73	98	95	96	193
POST I															
S-metolachlor& mesotrione& benoxacor + glyphosate[3] + AMS	1.0 & 0.1 + 0.78 + 3	0	0	85	92	0	99	99	0	99	99	0	96	98	193
S-metolachlor& atrazine&mesotrione& benoxacor[1]+ glyphosate[3] + AMS	1.0 & 0.38 & 0.1 + 0.78 + 3	0	0	91	98	0	98	99	0	83	99	0	94	94	194
S-metolachlor& atrazine&mesotrione& benoxacor[2] + glyphosate[3] + AMS	0.76 & 0.76 & 0.1 + 0.78 + 3	0	0	97	99	0	99	99	0	99	99	0	99	99	196
Glyphosate[4]+ AMS	0.77 + 3	0	0	43	40	0	97	95	0	43	25	0	79	61	23
POST II															
Glyphosate[4] + AMS	0.77 + 3	0	0	85	84	0	97	93	0	50	43	0	93	92	183
POST II / POST IV															
Glyphosate[4] + AMS / Glyphosate[4] + AMS	0.77 + 3/ 0.77 + 3	0	0	86	97	0	95	99	0	54	90	0	94	99	204
POST III															
Glyphosate[4] + AMS	0.77 + 3	0	0	92	90	0	97	96	0	53	43	0	98	98	189
Untreated		0	0	0	0	0	0	0	0	0	0	0	0	0	2
LSD (P = 0.05)		7	9	5	7	8	1	2	1	11	6	2	4	6	39

a. S-metolachlor & atrazine & mesotrione & benoxacor[1] = Lumax; S-metolachlor & atrazine & mesotrione & benoxacor[2] = Lexar; glyphosate[3] = Touchdown Total; glyphosate [4] = Roundup WeatherMax; NIS = AGRI-DEX nonionic surfactant, Helena; AMS = spray grade ammonium sulfate; COC = crop oil concentrate, Helena; 28% UAN = an aqueous solution of urea and ammonium nitrate.

b. Yield adjusted to 15.5% moisture. Corn yield variability due to extreme drought conditions in June and early July.