

Early preplant applications of flumioxazin alone and in tank-mixture with s-metolachlor & benoxacor in no-tillage corn production, Ames, IA, 2005. Owen, Micheal D.K., James F. Lux, and Damian D. Franzenburg. The purpose of this no-tillage corn study was to evaluate various early preplant application timings of flumioxazin alone and in tank-mixture with s-metolachlor & benoxacor for corn phytotoxicity, weed control and yield. The soil was a Clarion, Webster, Nicollet clay loam with a pH 7.3 and 6.6% organic matter. The experimental design was a randomized complete block with three replications and plots were 10 by 25 ft. The 2004 crop was soybean. Early preplant (EPP1, EPP2, EPP3, EPP4, EPP5) treatments were applied on April 8, 15, 21, 28, and May 4 at 20 gpa and 30 psi using flat fan nozzles, respectively. Conditions on April 8 were: air temperature 19 C, soil temperature at the 4-inch depth 13 C, 9 mph wind, 30% cloud cover, 47% relative humidity. Weed species occurring in the untreated control on April 8 included light common lambsquarters. On April 15 conditions were: air temperature 21 C, soil temperature at the 4-inch depth 14 C, 2 mph wind, 30% cloud cover, 27% relative humidity. Weed species, average size and number per ft² occurring in the untreated control included: giant foxtail, one leaf, 0.25 inch tall, zero to one plant; common lambsquarters, cotyledon to four leaves, 0.5 inches tall, zero to three plants. Conditions on April 21 conditions were: air temperature 17 C, soil temperature at the 4-inch depth 14 C, 9 mph wind, 100% cloud cover, 67% relative humidity. Weed species, average size and number per ft² occurring in the untreated control included: giant foxtail, one to two leaves, 0.25 inch tall, zero to one plant; velvetleaf, cotyledon, 0.25 inch tall, less than one plant; common lambsquarters, cotyledon to eight leaves, 0.5 inches tall, zero to three plants. On April 28 conditions were: air temperature 12 C, soil temperature at the 4-inch depth 12 C, 3 mph wind, 40% cloud cover, 31% relative humidity. Weed species, average size and number per ft² occurring in the untreated control included: giant foxtail, one to two leaves, 0.25 inch tall, zero to one plant; velvetleaf, cotyledon to two leaves, 0.25 to 0.5 inches tall, less than one plant; common waterhemp and common lambsquarters, cotyledon to numerous leaves, 0.25 to 1 inch tall, zero to three plants; ivyleaf morningglory, cotyledon, 1 inch tall, less than one plant. Conditions on May 4 were: air temperature 19 C, soil temperature at the 4-inch depth 12 C, 5 mph wind, 40% cloud cover, 25% relative humidity. Weed species, average size and number per ft² occurring in the untreated control included: giant foxtail, one to two leaves, 0.5 inch tall, less than one plant; velvetleaf, cotyledon to two leaf, 0.25 to 0.5 inches tall, less than one plant; common waterhemp and common lambsquarters, cotyledon to numerous leaves, 0.25 to 1.5 inches tall, zero to three plants; ivyleaf morningglory, cotyledon to three leaves, 1.5 inches tall, less than one plant. The study area was left untilled. Fertilization included 125 lb/A actual N applied as urea. Crop residue on the soil surface was 50 to 60% at planting. "Dekalb hybrid DKC 53-34" corn was planted 1.5 inches deep on May 5, at 30,200 seeds/A in 30-inch rows. Glyphosate plus AMS was applied postemergence at 0.77 lb ae/A plus 5 gallons/100 gallons to the study area on June 9, just prior to final weed control observations on June 10. The application was made to minimize the impact of weed competition and assess the affect of phytotoxicity on treatment corn yields. April rainfall included: 1.65, 0.07, 0.1, 0.15, 0.16, and 0.2 inches on April 11, 12, 16, 20, 21, and 22, respectively. Total rainfall for April was 2.32 inches. May rainfall included: 0.66, 0.41, 0.19, 0.33, and 0.25 inches on May 12, 18, 21, 25, and 29, respectively. Total rainfall for May was 1.83 inches. June rainfall included: 0.94, 0.5, 0.33, 0.33, 0.32, 0.2, 0.29, 0.43, 0.51, 0.89, and 0.25 inches on June 4, 8, 10, 11, 12, 20, 24, 25, 26, 27, and 29, respectively. Total rainfall for June was 4.98 inches. July rainfall included: 0 inches and 3.28 inches from July 1 through 15 and 16 through 31, respectively. Total rainfall for July was 3.28 inches. Rainfall total for August was 2.86 inches.

Significant differences between treatments in corn stand were observed on June 27. Significant corn injury was observed with many of the treatments which could have resulted in these differences. Injury persisted with the treatments through June 10, thirty-seven days after EPP5 application timing. EPP treatments applied closer to planting generally resulted in higher corn injury.

All application timings of flumioxazin plus glyphosate provided poor to fair giant foxtail control when observed on June 3 and 10. Treatments of flumioxazin that included s-metolachlor & benoxacor plus glyphosate provided good to excellent control on May 20, June 3 and 10. Velvetleaf and ivyleaf morningglory control was unacceptable with all treatment combinations and timings when observed on May 20, June 3 and 10. Good to excellent common waterhemp and common lambsquarters control was observed on all observation dates with all treatment combinations and application timings. Corn yields between treatments were variable ranging from 208 to 225 bu/A. The yield differences were not significant between treatments or the untreated control. (Dept. of Agronomy, Iowa State University, Ames).

Table 1. Early preplant applications of flumioxazin alone and in tank-mixture with s-metolachlor & benoxacor in no-tillage corn production, Ames, IA, 2005 (Owen, Lux, and Franzenburg).

Treatment ^a	Rate	Appl. time	Corn ^b stand	Injury 5/20/05	SETFA 5/20/05	ABUTH 5/20/05	AMATA 5/20/05	CHEAL 5/20/05	IPOHE 5/20/05
	(lb/A)			- (%) -	----- (% weed control) -----				
Untreated	-	-	31	0	0	0	0	0	0
Flumioxazin+ glyphosate ^c +AMS ^d	0.064+ 0.77+2.5	EPP1	32	1	73	65	97	95	53
Flumioxazin+ s-metolachlor&benoxacor+ glyphosate+AMS	0.064+ 1.6+ 0.77+2.5	EPP1	32	4	98	84	99	97	66
Flumioxazin+ glyphosate+AMS	0.064+ 0.77+2.5	EPP2	32	3	80	72	97	95	51
Flumioxazin+ s-metolachlor&benoxacor+ glyphosate+AMS	0.064+ 1.6+ 0.77+2.5	EPP2	30	8	96	85	99	99	74
Flumioxazin+ glyphosate+AMS	0.064+ 0.77+2.5	EPP3	31	8	90	74	99	96	54
Flumioxazin+ s-metolachlor&benoxacor+ glyphosate+AMS	0.064+ 1.6+ 0.77+2.5	EPP3	31	10	97	85	99	99	76
Flumioxazin+ glyphosate+AMS	0.064+ 0.77+2.5	EPP4	33	8	85	71	99	99	63
Flumioxazin+ s-metolachlor&benoxacor+ glyphosate+AMS	0.064+ 1.6+ 0.77+2.5	EPP4	32	15	98	81	99	99	73
Flumioxazin+ glyphosate+AMS	0.064+ 0.77+2.5	EPP5	31	8	89	74	99	98	69
Flumioxazin+ s-metolachlor&benoxacor+ glyphosate+AMS	0.064+ 1.6+ 0.77+2.5	EPP5	30	16	97	77	99	99	83
S-metolachlor&benoxacor+ glyphosate+AMS	1.6+ 0.77+2.5	EPP5	31	0	96	41	99	98	38
LSD (P=0.05)			2	5	5	15	2	3	13

^a Glyphosate plus AMS was applied postemergence to the entire study at 0.77 lb ae/A plus 5 gal/100 gal on June 9.

^b Corn stand per 17.5 row feet on June 27.

^c Glyphosate rate in lb ae/A.

^d AMS = ammonium sulfate. Rate in lb/100 gallons.

Table 2. Early preplant applications of flumioxazin alone and in tank-mixture with s-metolachlor & benoxacor in no-tillage corn production, Ames, IA, 2005 (Owen, Lux, and Franzenburg).

Treatment ^a	Rate	Appl. time	Injury 6/3/05	SETFA 6/3/05	ABUTH 6/3/05	AMATA 6/3/05	CHEAL 6/3/05	IPOHE 6/3/05
	(lb/A)		- (%) -	----- (% weed control) -----				
Untreated	-	-	0	0	0	0	0	0
Flumioxazin+	0.064+	EPP1	0	58	64	91	89	46
glyphosate ^b +AMS ^c	0.77+2.5							
Flumioxazin+	0.064+	EPP1	3	96	75	97	94	54
s-metolachlor&benoxacor+	1.6+							
glyphosate+AMS	0.77+2.5							
Flumioxazin+	0.064+	EPP2	3	60	60	94	93	46
glyphosate+AMS	0.77+2.5							
Flumioxazin+	0.064+	EPP2	8	95	70	98	94	69
s-metolachlor&benoxacor+	1.6+							
glyphosate+AMS	0.77+2.5							
Flumioxazin+	0.064+	EPP3	6	73	65	93	91	44
glyphosate+AMS	0.77+2.5							
Flumioxazin+	0.064+	EPP3	9	96	73	97	97	61
s-metolachlor&benoxacor+	1.6+							
glyphosate+AMS	0.77+2.5	EPP3						
Flumioxazin+	0.064+	EPP4	6	70	56	94	92	48
glyphosate+AMS	0.77+2.5							
Flumioxazin+	0.064+	EPP4	11	96	68	99	95	54
s-metolachlor&benoxacor+	1.6+							
glyphosate+AMS	0.77+2.5							
Flumioxazin+	0.064+	EPP5	6	74	60	95	93	59
glyphosate+AMS	0.77+2.5							
Flumioxazin+	0.064+	EPP5	11	97	70	98	96	55
s-metolachlor&benoxacor+	1.6+							
glyphosate+AMS	0.77+2.5							
S-metolachlor&benoxacor+	1.6+	EPP5	0	96	31	99	94	35
glyphosate+AMS	0.77+2.5							
LSD (P=0.05)			4	7	19	3	3	15

^a Glyphosate plus AMS was applied postemergence to the entire study at 0.77 lb ae/A plus 5 gal/100 gal on June 9.

^b Glyphosate rate in lb ae/A.

^c AMS = ammonium sulfate. Rate in lb/100 gallons.

Table 3. Early preplant applications of flumioxazin alone and in tank-mixture with s-metolachlor & benoxacor in no-tillage corn production, Ames, IA, 2005 (Owen, Lux, and Franzenburg).

Treatment ^a	Rate	Appl. time	Injury 6/10/05	SETFA 6/10/05	ABUTH 6/10/05	AMATA 6/10/05	CHEAL 6/10/05	IPOHE 6/10/05	Corn yield
	(lb/A)		- (%) -	----- (% weed control) -----					(bu/A)
Untreated	-	-	0	0	0	0	0	0	211
Flumioxazin+	0.064+	EPP1	4	51	63	90	89	43	217
glyphosate ^b +AMS ^c	0.77+2.5								
Flumioxazin+	0.064+	EPP1	5	94	71	97	91	51	221
s-metolachlor&benoxacor+	1.6+								
glyphosate+AMS	0.77+2.5								
Flumioxazin+	0.064+	EPP2	6	53	60	94	93	41	222
glyphosate+AMS	0.77+2.5								
Flumioxazin+	0.064+	EPP2	10	93	70	98	94	60	221
s-metolachlor&benoxacor+	1.6+								
glyphosate+AMS	0.77+2.5								
Flumioxazin+	0.064+	EPP3	10	64	64	93	90	39	221
glyphosate+AMS	0.77+2.5								
Flumioxazin+	0.064+	EPP3	14	95	73	97	95	53	208
s-metolachlor&benoxacor+	1.6+								
glyphosate+AMS	0.77+2.5	EPP3							
Flumioxazin+	0.064+	EPP4	10	61	56	93	90	43	225
glyphosate+AMS	0.77+2.5								
Flumioxazin+	0.064+	EPP4	15	94	68	99	91	48	224
s-metolachlor&benoxacor+	1.6+								
glyphosate+AMS	0.77+2.5								
Flumioxazin+	0.064+	EPP5	11	66	58	91	90	40	210
glyphosate+AMS	0.77+2.5								
Flumioxazin+	0.064+	EPP5	16	94	69	97	96	46	220
s-metolachlor&benoxacor+	1.6+								
glyphosate+AMS	0.77+2.5								
S-metolachlor&benoxacor+	1.6+	EPP5	0	91	29	99	93	31	219
glyphosate+AMS	0.77+2.5								
LSD (P=0.05)			4	8	19	3	4	14	17

^a Glyphosate plus AMS was applied postemergence to the entire study at 0.77 lb ae/A plus 5 gal/100 gal on June 9.

^b Glyphosate rate in lb ae/A.

^c AMS = ammonium sulfate. Rate in lb/100 gallons.