

Corn Weed Management Studies

Brent A. Pringnitz,
extension program specialist
Robert G. Hartzler, professor,
Department of Agronomy

Introduction

Several studies were conducted in corn to evaluate commercially available herbicides for weed control, crop phytotoxicity, and crop yield. Various herbicide treatment combinations and application methods were evaluated.

Materials and Methods

The studies were established using a randomized complete block design with three replications. Herbicide evaluation plot size was 10 ft by 25 ft. Herbicides were applied in 20 gallons of water/acre. Visual estimates of percentage weed control and crop injury data were made throughout June and July. Weed control observations are compared with an untreated control and made on a zero to 100 rating scale with zero percent equaling no weed control. Crop injury ratings are on a 0 to 100 rating scale, with 0 representing no crop injury. Weed species and populations evaluated included: 50 to 100 foxtail, 30 to 75 waterhemp and 2 to 10 lambsquarters, Pennsylvania smartweed, and velvetleaf/ft².

The soil was a Canisteo clay loam with a pH of 6.9 and 7.5% organic matter. The experimental design was a randomized complete block with three replications. The 2001 crop was soybeans. Tillage included spring field cultivation. Fertilization included 287 lbs/acre 82-0-0 and

416 lbs/acre of 10-25-27. Crop residue on the soil surface was 14% at planting. 'Golden Harvest hybrid 8562' corn was planted 1.75 inches deep on May 15 at 29,900 seeds/acre in 30-inch rows. Herbicide application dates and crops stages are presented in Table 1. A summary of precipitation data are presented in Table 2.

Results and Discussion

KC-meso (Table 3) – Low rainfall following planting limited performance of many preemergence treatments. Treatments 3 and 7 had the highest grain yields of the PRE treatments, with yields comparable to the total-POST treatments.

KC-syst (Table 4) – Early-season foxtail control from preemergence products was generally poor and variable. Clarity, Accent Gold, and Basis Gold provided poor control of waterhemp. Treatments containing an ALS-inhibitor for POST control of grasses (Option, Steadfast, Accent, others) provided the best foxtail control.

KC-pre (Table 5) – Bicep Lite II Magnum failed to control foxtail and many of the broadleaves. Balance Pro in combination with Surpass and atrazine provided the most consistent control of both broadleaves and grasses.

Acknowledgments

Monsanto, BASF, and Syngenta provided support for these studies, and Bruce Battles and Golden Harvest, provided seed. The authors also acknowledge Dave Rueber for his assistance.

Table 1. Treatment dates and crop stages.

Treatment	Corn	
	Date	Crop stage
Preemergence (PRE)	May 15	--
Early Postemergence (EPOST)	June 10	V3 - 8"
Postemergence (POST)	June 14	V4 - 12"

Table 2. Weekly rainfall totals and largest single rainfall following planting.

Weeks after planting	Total rainfall (inches)	Largest single rainfall event (inches)
1	0.00	0.00
2	0.42	0.32
3	1.02	0.88
4	0.66	0.66
5	0.19	0.17
6	0.39	0.25
7	0.00	0.00
8	0.00	0.00

Table 3. Callisto and Dual Magnum premix formulations with and without atrazine (KC-meso).

Trt No.	Treatment Name	Rate	Unit	Grow Stg	Crop injury	Foxtail	Waterhemp	Velvetleaf	Foxtail	Waterhemp	Velvetleaf	Lambsqt.	Crop yield
					Jun-10-02 ^a	Jun-10-02	Jun-10-02	Jun-10-02	Jul-12-02	Jul-12-02	Jul-12-02	Jul-12-02	Oct-11-02
1	Untreated				0 a	0 c	0 c	0 b	0 c	0 c	0 c	0 c	112
2	Lumax	2.5	qt/a	pre	0 a	82 a	89 a	70 a	77 b	96 a	96 a	88 a	161 b
3	Lumax	3	qt/a	pre	0 a	65 ab	94 a	90 a	73 b	96 a	97 a	98 a	171 a
4	Camix	2	qt/a	pre	0 a	50 b	98 a	87 a	70 b	88 b	96 a	96 a	162 b
5	Camix	2.4	qt/a	pre	0 a	70 ab	98 a	96 a	73 b	94 a	99 a	98 a	167 ab
6	Bicep Lite II Magnum	2	qt/a	pre	0 a	47 b	60 b	70 a	73 b	92 ab	77 b	65 b	152 b
7	Balance Pro	3	fl oz/a	pre	0 a	77 a	98 a	98 a	93 a	99 a	99 a	99 a	179 a
	AAtrex-DF	1.11	lb/a	pre									
8	Harness Xtra	2	qt/a	pre	0 a	75 a	96 a	70 a	78 b	95 a	73 b	67 b	151 b
9	Topnotch	2.5	qt/a	pre	0 a	83 a	99 a	63 a	82 b	95 a	83 ab	88 a	156 b
	Hornet WDG	2.62	oz/a	pre									
10	Outlook	0.56	qt/a	pre	0 a	83 a			82 b	99 a	99 a	99 a	169 a
	Marksman	1.5	qt/a	post									
	COC	1	% v/v	post									
11	Lumax	2.5	qt/a	e-post	0 a				98 a	99 a	99 a	99 a	172 a
	Accent	0.33	oz/a	e-post									
12	Lumax	3	qt/a	e-post	0 a				98 a	99 a	99 a	99 a	179 a
	Accent	0.33	oz/a	e-post									
13	Camix	2	qt/a	e-post	0 a				97 a	99 a	99 a	99 a	178 a
	Accent	0.33	oz/a	e-post									
14	Camix	2.4	qt/a	e-post	0 a				97 a	99 a	99 a	99 a	179 a
	Accent	0.33	oz/a	e-post									
LSD (P=.05)					0.0	17.7	20.6	25.2	8.3	4.6	11.0	9.6	16.7

^a The June 10th ratings are based on performance of PRE treatments only. Postemergence treatments had not been applied.

^b Missing data indicates treatments were not completed at that time and were not rated.

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Table 4. Evaluation of various herbicide systems in corn (KC-syst).

Trt No.	Treatment Name	Rate	Rate Unit	Grow Stg	Foxtail	Waterhemp	Crop injury	Foxtail	Velvetleaf	Lambsqt.	Waterhemp	Crop yield
					Jun-10-02	Jun-10-02	Jul-12-02	Jul-12-02	Jul-12-02	Jul-12-02	Jul-12-02	Oct-11-02
1	Dual II Magnum	1.7	pt/a	pre	43 a	27 b	0 a	83 c-f	99 a	99 a	99 a	187 a
	Callisto		3 fl oz/a	post								
	Atrazine		1 lb a/a	post								
	28% UAN		1 % v/v	post								
	COC		1 % v/v	post								
2	Dual II Magnum	1.7	pt/a	pre	53 a	78 ab	0 a	75 ef	99 a	99 a	99 a	190 a
	Callisto		3 fl oz/a	post								
	Sencor	0.5	oz/a	post								
	28% UAN		1 % v/v	post								
	NIS	0.5	% v/v	post								
3	Dual II Magnum	1.7	pt/a	pre	50 a	55 ab	25 a	83 c-f	99 a	99 a	99 a	165 a
	Callisto		3 fl oz/a	post								
	Sencor	1.0	oz/a	post								
	28% UAN		1 % v/v	post								
	NIS	0.5	% v/v	post								
4	Dual II Magnum	1.7	pt/a	pre	65 a	50 ab	0 a	73 f	99 a	98 a	99 a	163 a
	Callisto		3 fl oz/a	post								
	28% UAN		5 qt/a	post								
	COC		1 qt/a	post								
5	Epic	11	oz/a	pre	43 a	63 ab	0 a	97 ab	99 a	98 a	98 a	189 a
	Option	1.5	oz/a	post								
	MSO	1.5	pt/a	post								
	28% UAN		1.5 qt/a	post								
6	Option	1.75	oz/a	post			0 a	92 a-d	99 a	99 a	92 a	177 a
	Callisto		3 fl oz/a	post								
	COC		1 % v/v	post								
	28% UAN		2.5 % v/v	post								
7	Steadfast	0.5	oz/a	post			2 a	99 a	99 a	99 a	99 a	182 a
	Callisto		3 fl oz/a	post								
	COC		1 % v/v	post								
	28% UAN		2.5 % v/v	post								
8	Accent	0.66	oz/a	post			0 a	98 ab	99 a	95 a	78 b	179 a
	Clarity		4 fl oz/a	post								
	NIS	0.5	% v/v	post								
	28% UAN		2 qt/a	post								
9	Harness Xtra	2	pt/a	pre	65 a	96 a	0 a	84 b-f	99 a	99 a	99 a	166 a
	Distinct		3 oz/a	post								
	NIS	0.25	% v/v	post								
	AMS		3 lb/a	post								
10	Bicep Lite II Magnum	1.9	qt/a	pre	50 a	95 a	0 a	88 a-e	99 a	99 a	96 a	172 a
	Northstar		5 oz/a	post								
	NIS	0.25	% v/v	post								
	28% UAN		2 % v/v	post								
11	Outlook	1	pt/a	pre	40 a	62 ab	0 a	78 ef	99 a	99 a	99 a	173 a
	Aim	0.33	oz/a	post								
	Atrazine		1 lb/a	post								
	NIS	0.25	% v/v	post								
	28% UAN		2 qt/a	post								
12	Harness	2	pt/a	pre	77 a	99 a	0 a	80 def	99 a	99 a	99 a	165 a
	Yukon		6 oz/a	post								
	NIS	0.5	% v/v	post								
	28% UAN		2 qt/a	post								

(continued on next page)

Table 4. (continued)

Trt No.	Treatment Name	Rate	Unit	Grow Stg	Foxtail	Waterhemp	Crop injury	Foxtail	Velvetleaf	Lambsqt.	Waterhemp	Crop yield
					Jun-10-02	Jun-10-02	Jul-12-02	Jul-12-02	Jul-12-02	Jul-12-02	Jul-12-02	Oct-11-02
13	Basis Gold	14	oz/a	post			0 a	94 abc	99 a	76 b	78 b	185 a
	COC	2	pt/a	post								
	28% UAN	2	qt/a	post								
14	Accent Gold	2.9	oz/a	post			0 a	99 a	98 a	90 a	60 c	182 a
	COC	1	pt/a	post								
	28% UAN	2	qt/a	post								
15	treatment deleted											
16	Leadoff	1.9	pt/a	pre	60 a	88 ab	3 a	98 ab	96 b	99 a	99 a	179 a
	Basis Gold	14	oz/a	post								
	COC	2	pt/a	post								
	28% UAN	2	qt/a	post								
17	Leadoff	1.9	pt/a	pre	73 a	85 ab	0 a	97 ab	99 a	99 a	99 a	189 a
	Accent Gold	1.5	oz/a	post								
	Atrazine	0.5	lb a/a	post								
	COC	1	qt/a	post								
	28% UAN	2	qt/a	post								
18	Guardsman Max	4.5	pt/a	pre	68 a	95 a	0 a	93 abc	99 a	99 a	99 a	185 a
	Distinct	4	oz/a	post								
	NIS	0.25	% v/v	post								
	28% UAN	2	% v/v	post								
19	Leadoff	1.9	pt/a	pre	77 a	78 ab	0 a	99 a	99 a	98 a	98 a	178 a
	Steadfast	0.5	oz/a	post								
	Clarity	4	fl oz/a	post								
	COC	1	% v/v	post								
	28% UAN	2	qt/a	post								
20	Untreated						0 a	0 g	0 c	0 c	0 d	120 b
LSD (P=.05)					28.1	38.1	16.5	8.5	1.3	12.2	6.9	15.5

Missing data indicate treatments were not completed at that time and were not rated.

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

Table 5. Comparison of preemergence corn herbicides (KC-pre).

Trt No.	Treatment Name	Rate	Unit	Grow Stg	Foxtail	Waterhemp	Penn. Smartweed	Foxtail	Velvetleaf	Lambsqt.	Waterhemp
					Jun-10-02	Jun-10-02	Jun-10-02	Jun-25-02	Jun-25-02	Jun-25-02	Jun-25-02
1	Bicep Lite II Magnum	1.5	qt/a	pre	30 c	80 a	20 d	60 b	78 a	68 b	80 b
2	Epic	11	oz/a	pre	33 bc	93 a	30 cd	85 a	95 a	85 ab	82 b
3	Degree Xtra	3.2	qt/a	pre	68 ab	99 a	73 abc	78 ab	86 a	88 ab	95 a
4	FulTime	3.0	qt/a	pre	85 a	99 a	83 ab	86 a	83 a	82 ab	96 a
5	Guardsman Max	4	pt/a	pre	58 abc	96 a	43 bcd	84 a	90 a	78 ab	90 a
6	Bicep Lite II Magnum	1.5	qt/a	pre	50 abc	96 a	99 a	73 ab	87 a	87 ab	94 a
	Callisto	5	fl oz/a	pre							
7	Dual II Magnum	1.7	pt/a	pre	62 abc	95 a	73 abc	83 a	82 a	75 ab	95 a
	Callisto	5	fl oz/a	pre							
	AAtrex-DF	0.75	lb a/a	pre							
8	Balance Pro	2.25	fl oz/a	pre	85 a	99 a	87 ab	92 a	90 a	89 a	96 a
	Surpass	3	pt/a	pre							
	Atrazine	0.75	lb a/a	pre							
9	Bicep Lite II Magnum	1.5	qt/a	pre	60 abc	88 a	75 abc	75 ab	85 a	80 ab	92 a
	Hornet WDG	5	oz/a	pre							
10	Untreated				0 d	0 b	0 d	0 c	0 b	0 c	0 c
LSD (P=.05)					24.3	15.7	34.5	13.7	12.5	12.4	6.3

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).