Effect of Nitrogen on Common Waterhemp Control in Corn.

02-50W-S80

OBJECTIVE: This study was designed to evaluate the effect of nitrogen on common waterhemp control in corn.

SUMMARY: Nitrogen had an effect on common waterhemp control at 14 days after treatment (DAT) where no soil herbicide or no Callisto was applied. Common waterhemp control decreased as nitrogen rate was increased from 0 to 50 lb/A. Nitrogen had no effect on common waterhemp control where soil herbicides were applied with control ranging from 96 to 100%. However, common waterhemp control with Callisto was decreased by 13 to 18% where nitrogen was applied. Nitrogen also affected common waterhemp height with a 42 to 50% reduction in common waterhemp height 28 and 56 DAT where no nitrogen was applied. The greatest common waterhemp population was observed where nitrogen at 100 lb/A was applied. Fresh weight of common waterhemp was increased as nitrogen rate was increased from 50 to 100 lb/A. Common waterhemp competition reduced corn height by 22 to 35% 56 DAT and reduced grain yield by 28 to 68%.

HERBICIDES	WEEDS	CROP
BICEP II MAGNUM 5.5 L CALLISTO 4 SC LIGHTNING 70 WG	waterhemp, common	corn, field

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PLANT, SOIL AND GENERAL AGRICULTURE DEPARTMENT

SOUTHERN ILLINOIS UNIVERSITY

Effect of Nitrogen on Common Waterhemp Control in Corn.

Project Code: 02-50W-S80 Location: Belleville Research Center

Investigator: Bryan Young, Assistant Professor, Southern Illinois University

City State Zip Country: Belleville IL 62221 USA
Trial Status: Final **Updated:** 11-4-02

Weed Code	Common Name	Scientific Name
1.	AMATA waterhemp, common	Amaranthus rudis Sauer

Crop 1: ZEAMX corn, field **Variety:** Pioneer 33P71 CL
Planting Method: Seeded **Planting Date:** 5-30-02
Rate: 28000 S/A **Depth:** 1.5 IN
Row Spacing: 30 IN

Plot Width, Unit: 10 FT **Plot Length, Unit:** 27 FT **Reps:** 3
Tillage Type: Reduced-Till **Study Design:** Randomized complete block
Previous Crop, Year: GLXMA, 2001

Field Prep./Maintenance: N (see note), P2O5 50 LB/A, K2O 200 LB/A

Soil Name: Weir **% OM:** 1.4 **pH:** 6.5 **CEC:** 12
Texture: Silt loam **Fert. Level:** P1: 77 LB/A, K: 198 LB/A

APPLICATION DESCRIPTION

	A	B	C	D	E
Application Date:	5-30-02	6-2-02	6-14-02	6-19-02	6-24-02
Time of Day:	17:00	7:00	8:00	10:45	11:15
Application Method:	Spray	Hand Spread	Spray	Spray	Spray
Application Timing:	PRE-1	PRE-2	3"GR-1	3"GR-2	4-6"WH
Applic. Placement:	BROSOI	BROSOI	BROFOL	BROFOL	BROFOL
Air Temp., Unit:	84 F	76 F	69 F	88 F	88 F
% Relative Humidity:	48	72	50	40	30
Wind Velocity, Unit:	0-3 MPH	0 MPH	5-10 MPH	5-10 MPH	0-5 MPH
Soil Moisture:	NORMAL	NORMAL	NORMAL	NORMAL	BELNOR
% Cloud Cover:	15		10	15	20

CROP STAGE AT EACH APPLICATION

	A	B	C	D	E
Crop 1 Code, Stage:	ZEAMX NA	ZEAMX NA	ZEAMX V4	ZEAMX V5	ZEAMX V5-V6
Height, Unit:	NA NA	NA NA	6-10 IN	10-12 IN	13-16 IN

WEED STAGE AT EACH APPLICATION

	A	B	C	D	E
Weed 1 Code:			AMATA		AMATA
Stage(leaves):			0-8		4-15
Height(inches):			0-3		1-8
Density:			Medium		High

APPLICATION EQUIPMENT

	A	B	C	D	E
Appl. Equipment:	CO2 sprayer	Hand spread	CO2 sprayer	CO2 sprayer	CO2 sprayer
Operating Pressure:	40 PSI	NA	40 PSI	40 PSI	40 PSI
Nozzle Type:	Flat fan	NA	Flat fan	Flat fan	Flat fan
Nozzle Size:	8002	NA	8002	8002	8002
Boom Length, Unit:	7.5 FT	7.5 FT	7.5 FT	7.5 FT	7.5 FT
Spray Volume, Unit:	20 GPA	NA NA	20 GPA	20 GPA	20 GPA

NOTES:
Nitrogen applications either 0, 50, 100 or 150 lb N/A, see treatment list.
Harvested Oct-12-02, (2) 30 inch rows by 24 ft.

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Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Prod Rate	Prod Unit	Grow Stg	Appl Code	ZEAMX Yield bu/A	ZEAMX HEIRED Percent	ZEAMX HEIRED Percent	ZEAMX HEIRED Percent	ZEAMX Height Inch	AMATA Control Percent	AMATA Control Percent	AMATA Control Percent	AMATA HEIRED Percent	AMATA HEIRED Percent	AMATA Plants 1.0 m2	AMATA Fresh Wt g/1.0 m2	AMATA Dry Wt g/1.0 m2
	Weed Code														AMATA	AMATA	AMATA	AMATA	AMATA	AMATA	AMATA	AMATA
	Crop Code									ZEAMX	ZEAMX	ZEAMX	ZEAMX	ZEAMX								
	Rating Data Type									Yield	HEIRED	HEIRED	HEIRED	Height	Control	Control	Control	HEIRED	HEIRED	Plants	Fresh Wt	Dry Wt
	Rating Unit									bu/A	Percent	Percent	Percent	Inch	Percent	Percent	Percent	Percent	Percent	1.0 m2	g/1.0 m2	g/1.0 m2
	Rating Date									10-12-02				9-26-02						7-25-02	7-25-02	7-25-02
	Trt-Eval Interval										14 DAT	28 DAT	56 DAT	EOS	14 DAT	28 DAT	56 DAT	28 DAT	56 DAT	56 DAP	56 DAP	56 DAP
1	NO NITROGEN FERTILIZER									26	0	42	67	65	30	17	0	42	50	88	849	147
1	LIGHTNING	70	WG	0.056	LB A/A	1.28	OZ/A	3"GR-1	C													
1	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	3"GR-1	C													
2	FERTILIZER 34-0-0	34	DRY	50	LB A/A	147	LB/A	PRE-2	B	39	0	3	50	76	0	17	0	17	17	58	873	119
2	LIGHTNING	70	WG	0.056	LB A/A	1.28	OZ/A	3"GR-1	C													
2	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	3"GR-1	C													
3	FERTILIZER 34-0-0	34	DRY	100	LB A/A	294	LB/A	PRE-2	B	57	0	0	32	75	0	0	0	0	0	100	1951	269
3	LIGHTNING	70	WG	0.056	LB A/A	1.28	OZ/A	3"GR-1	C													
3	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	3"GR-1	C													
4	FERTILIZER 34-0-0	34	DRY	150	LB A/A	440	LB/A	PRE-2	B	94	0	0	22	86	0	0	0	0	0	68	2113	276
4	LIGHTNING	70	WG	0.056	LB A/A	1.28	OZ/A	3"GR-1	C													
4	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	3"GR-1	C													
5	NO NITROGEN FERTILIZER									80	0	20	32	83	100	100	100	100	100			
5	LIGHTNING	70	WG	0.056	LB A/A	1.28	OZ/A	3"GR-1	C													
5	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	3"GR-1	C													
5	HANDWEED AFTER POST APP																					
6	FERTILIZER 34-0-0	34	DRY	50	LB A/A	147	LB/A	PRE-2	B	100	0	10	20	84	100	100	100	100	100			
6	LIGHTNING	70	WG	0.056	LB A/A	1.28	OZ/A	3"GR-1	C													
6	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	3"GR-1	C													
6	HANDWEED AFTER POST APP																					
7	FERTILIZER 34-0-0	34	DRY	100	LB A/A	294	LB/A	PRE-2	B	139	0	0	0	92	100	100	100	100	100			
7	LIGHTNING	70	WG	0.056	LB A/A	1.28	OZ/A	3"GR-1	C													
7	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	3"GR-1	C													
7	HANDWEED AFTER POST APP																					
8	FERTILIZER 34-0-0	34	DRY	150	LB A/A	440	LB/A	PRE-2	B	130	0	0	0	90	100	100	100	100	100			
8	LIGHTNING	70	WG	0.056	LB A/A	1.28	OZ/A	3"GR-1	C													
8	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	3"GR-1	C													
8	HANDWEED AFTER POST APP																					
9	BICEP II MAGNUM	5.5	L	2.89	LB A/A	2.1	QT/A	PRE-1	A	75	0	7	25	82	100	99	98	97	75			
9	NO NITROGEN FERTILIZER																					
9	LIGHTNING	70	WG	0.056	LB A/A	1.28	OZ/A	3"GR-2	D													
9	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	3"GR-2	D													

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Prod Rate	Prod Unit	Grow Stg	Appl Code	ZEAMX Yield bu/A 10-12-02	ZEAMX HEIRED Percent 14 DAT	ZEAMX HEIRED Percent 28 DAT	ZEAMX HEIRED Percent 56 DAT	ZEAMX Height Inch 9-26-02 EOS	AMATA Control Percent 14 DAT	AMATA Control Percent 28 DAT	AMATA Control Percent 56 DAT	AMATA HEIRED Percent 28 DAT	AMATA HEIRED Percent 56 DAT	AMATA Plants 1.0 m2 7-25-02 56 DAP	AMATA Fresh Wt g/1.0 m2 7-25-02 56 DAP	AMATA Dry Wt g/1.0 m2 7-25-02 56 DAP
10	BICEP II MAGNUM	5.5	L	2.89	LB A/A	2.1	QT/A	PRE-1	A	112	0	0	17	89	100	100	99	100	97			
10	FERTILIZER 34-0-0	34	DRY	50	LB A/A	147	LB/A	PRE-2	B													
10	LIGHTNING	70	WG	0.056	LB A/A	1.28	OZ/A	3"GR-2	D													
10	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	3"GR-2	D													
11	BICEP II MAGNUM	5.5	L	2.89	LB A/A	2.1	QT/A	PRE-1	A	161	0	0	0	95	100	100	96	100	78			
11	FERTILIZER 34-0-0	34	DRY	100	LB A/A	294	LB/A	PRE-2	B													
11	LIGHTNING	70	WG	0.056	LB A/A	1.28	OZ/A	3"GR-2	D													
11	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	3"GR-2	D													
12	BICEP II MAGNUM	5.5	L	2.89	LB A/A	2.1	QT/A	PRE-1	A	170	0	0	0	97	100	100	100	100	100			
12	FERTILIZER 34-0-0	34	DRY	150	LB A/A	440	LB/A	PRE-2	B													
12	LIGHTNING	70	WG	0.056	LB A/A	1.28	OZ/A	3"GR-2	D													
12	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	3"GR-2	D													
13	NO NITROGEN FERTILIZER									72	50	35	32	81	100	98	98	97	97			
13	LIGHTNING	70	WG	0.056	LB A/A	1.28	OZ/A	3"GR-1	C													
13	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	3"GR-1	C													
13	CALLISTO	4	SC	0.094	LB A/A	3	OZ/A	4-6"WH	E													
13	PRIME OIL COC	100	LIQ	1.0	% V/V	1	%V/V	4-6"WH	E													
13	28% UAN	100	LIQ	2.5	% V/V	2.5	%V/V	4-6"WH	E													
14	FERTILIZER 34-0-0	34	DRY	50	LB A/A	147	LB/A	PRE-2	B	96	45	40	32	81	90	80	80	73	55			
14	LIGHTNING	70	WG	0.056	LB A/A	1.28	OZ/A	3"GR-1	C													
14	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	3"GR-1	C													
14	CALLISTO	4	SC	0.094	LB A/A	3	OZ/A	4-6"WH	E													
14	PRIME OIL COC	100	LIQ	1.0	% V/V	1	%V/V	4-6"WH	E													
14	28% UAN	100	LIQ	2.5	% V/V	2.5	%V/V	4-6"WH	E													
15	FERTILIZER 34-0-0	34	DRY	100	LB A/A	294	LB/A	PRE-2	B	127	23	8	10	86	90	85	86	63	63			
15	LIGHTNING	70	WG	0.056	LB A/A	1.28	OZ/A	3"GR-1	C													
15	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	3"GR-1	C													
15	CALLISTO	4	SC	0.094	LB A/A	3	OZ/A	4-6"WH	E													
15	PRIME OIL COC	100	LIQ	1.0	% V/V	1	%V/V	4-6"WH	E													
15	28% UAN	100	LIQ	2.5	% V/V	2.5	%V/V	4-6"WH	E													
16	FERTILIZER 34-0-0	34	DRY	150	LB A/A	440	LB/A	PRE-2	B	153	0	0	0	91	97	87	87	87	60			
16	LIGHTNING	70	WG	0.056	LB A/A	1.28	OZ/A	3"GR-1	C													
16	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	3"GR-1	C													
16	CALLISTO	4	SC	0.094	LB A/A	3	OZ/A	4-6"WH	E													
16	PRIME OIL COC	100	LIQ	1.0	% V/V	1	%V/V	4-6"WH	E													
16	28% UAN	100	LIQ	2.5	% V/V	2.5	%V/V	4-6"WH	E													
LSD (P=.05)										19.0	8.9	10.2	11.8	9.7	21.7	17.1	5.3	19.5	24.6	37.4	884.7	139.3
Replicate F										3.029	1.812	2.063	0.198	2.881	1.118	1.733	0.870	0.423	2.077	2.003	1.662	1.775
Replicate Prob(F)										0.0634	0.1808	0.1448	0.8212	0.0717	0.3402	0.1939	0.4294	0.6590	0.1429	0.2156	0.2665	0.2479
Treatment F										42.100	29.178	18.775	23.023	5.950	30.005	45.282	544.282	31.183	17.810	3.085	7.059	4.120
Treatment Prob(F)										0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.1116	0.0215	0.0663

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Trial Comments

1. Protocol: SIU (RFK).
2. 3"GR-1 is 3 inch grass for POST only treatments, 3"GR-2 is 3 inch grass for PRE/POST treatments. 4-6"WH = 4 to 6 inch common waterhemp.
3. EOS = End of season. DAT = days after treatment. HEIRED = height reduction. DAP = days after planting. 1.0 m2 = 1.0 square meter.
4. Rating dates:
   Ratings at 14, 28, and 56 days after the PRE application were on 6-13-02, 6-27-02, and 7-25-02, respectively.
   Ratings at 14, 28, and 56 days after the 4-6"WH application were on 7-8-02, 7-22-02, and 8-19-02, respectively.
5. ZEAMX and AMATA height reduction due to lack of nitrogen.