

Purdue Weed Science

Corn Herbicide Programs for Waterhemp Control

Trial ID: 23-MGS-Corn-02
 Protocol ID: 23-MGS-Corn-02 Location: Meigs Trial Year: 2023
 Study Director: Dr. Bill Johnson Sponsor Contact: Taylor Miller

Investigator: Dr. Bill Johnson

General Trial Information

Study Director: Dr. Bill Johnson **Title:** Professor
Investigator: Dr. Bill Johnson **Title:** Professor

Discipline: H herbicide
Status: E established

ARM Trial Created On: Mar-20-2023
Initiation Date: May-5-2023 **Planned Completion Date:** Oct-15-2023

Trial Location

City: Lafayette **Country:** USA United States
State/Prov.: Indiana
Postal Code: 47907

Regulations

Conducted Under GLP: No
Conducted Under GEP: No

Contacts

Role: STYDIR study director
Study Director: Dr. Bill Johnson **Title:** Professor
Organization: Purdue University
Address 1: 915 W. State Street
Country: USA United States **E-mail:** wgj@purdue.edu
City: West Lafayette **State/Prov:** IN **Postal Code:** 47906
Role: INVEST investigator
Investigator: Dr. Bill Johnson **Title:** Professor
Organization: Purdue University
Address 1: 915 W. State Street
Country: USA United States **E-mail:** wgj@purdue.edu
City: West Lafayette **State/Prov:** IN **Postal Code:** 47907
Role: SPONSR sponsor
Sponsor: Taylor Miller
Organization: UPL
Role: COOPER cooperater
Cooperator: Jay Young **Title:** Superintendent
Organization: Purdue University
Address 1: 8343 US 231 S **Phone No.:** (765) 538-3422
Country: USA United States **E-mail:** jayyoung@purdue.edu
City: Lafayette **State/Prov:** IN **Postal Code:** 47907
Role: SPONSR sponsor
Contact Name 5: Jay Turner
Organization: Summit Agro

Crop Description

Crop 1: C ZEAMX Zea mays Corn
Entry Date: May-24-2023 **Stage Scale:** BBCH
Variety: DKC 50-87 RIB
Attributes: Glyphosate-R and Glufosinate-R
Planting Date: May-5-2023 **Planting Rate:** 35000 S/A
Depth: 1.5 IN
Rows per Plot: 4 **Planting Method:** PLANTD planted
Row Spacing: 30 IN **Planting Equipment:** PP plot planter
Soil Moisture: NORMAL normal, adequate
Emergence Date: May-12-2023

Pest Description

Pest 1 Type: W **Code:** AMBTR Ambrosia trifida **Entry Date:** Jun-15-2023
Common Name: Giant ragweed **Stage Scale:** BBCH
Pest 2 Type: W **Code:** ECHCG Echinochloa crus-galli **Entry Date:** Jun-15-2023
Common Name: common barnyardgrass **Stage Scale:** BBCH
Pest 3 Type: W **Code:** AMATU Amaranthus tuberculatus **Entry Date:** Jun-15-2023
Common Name: tall waterhemp **Stage Scale:** BBCH
Attributes: Glyphosate-R and PPO-R

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Site and Design

Treated Plot Width: 6.67 FT **Site Type:** FIELD field
Treated Plot Length: 30 FT **Experimental Unit:** 1 PLOT plot
Treated Plot Area: 200.1 FT² **Tillage Type:** NOTILL no-till
Replications: 4 **Treatments:** 12 **Plots:** 48 **Study Design:** RACOB L Randomized Complete Block (RCB)

Field Prep./Maintenance:

Roundup PowerMax 3 (30 fl oz/A) + 2,4-D (1 pint/A) applied 04/12/2023.
 Gramoxone (3 pt/A) applied 05/04/2023.
 180 lbs of N applied as 28% UAN on 5/9/23.

Soil Description

Description Name: MEIGS-S3
% Sand: 21 **% OM:** 2.2 **Texture:** SIL silt loam
% Silt: 54 **Soil Name:** Starks-Fincastle complex
% Clay: 25 **Fert. Level:** G good
 pH: 6.8 **CEC:** 8.3

No.	Date	Moisture Total	Unit	Min Temp	Max Temp	Avg Temp	Temp Unit	Max Wind	Avg Wind	Unit
1.	May-1-2023	0.27	IN	39.7	46.4	42.6	F		10.7	MPH
2.	May-2-2023	0	IN	41	57.9	47.1	F		7.8	MPH
3.	May-3-2023	0	IN	39.2	62.4	49.3	F		5.4	MPH
4.	May-4-2023	0	IN	36.3	71.4	55.6	F		2	MPH
5.	May-5-2023	0	IN	49.1	78.1	64.2	F		7.2	MPH
6.	May-6-2023	0.06	IN	57.7	77.5	67.1	F		9.2	MPH
7.	May-7-2023	0.76	IN	60.8	79.7	69.1	F		9.2	MPH
8.	May-8-2023	0.08	IN	58.3	75.9	66.9	F		6.7	MPH
9.	May-9-2023	0	IN	54	75.2	64	F		5.4	MPH
10.	May-10-2023	0	IN	52.9	78.3	65.8	F		3.1	MPH
11.	May-11-2023	0	IN	53	81.4	67.94	F		1.8	MPH
12.	May-12-2023	0.02	IN	63.4	79	70.76	F		0.9	MPH
13.	May-13-2023	0.17	IN	66.5	80	72.06	F		1.2	MPH
14.	May-14-2023	0.58	IN	58.7	72.8	65.19	F		4.8	MPH
15.	May-15-2023	0.06	IN	54.3	71.8	61.5	F		2.1	MPH
16.	May-16-2023	0.02	IN	53.9	71.4	62.06	F		0.9	MPH
17.	May-17-2023	0	IN	49.9	70.2	60.7	F		2.3	MPH
18.	May-18-2023	0	IN	44	74	59.75	F		2.2	MPH
19.	May-19-2023	1.15	IN	57.1	79.6	64.84	F		1.5	MPH
20.	May-20-2023	0.01	IN	47.6	66.3	57.57	F		0	MPH
21.	May-21-2023	0	IN	44.3	78	62.38	F		0.3	MPH
22.	May-22-2023	0	IN	51.1	80	67.15	F		0.2	MPH
23.	May-23-2023	0	IN	56.7	82	70.38	F		0.3	MPH
24.	May-24-2023	0	IN	54.4	82.9	70.73	F		1	MPH
25.	May-25-2023	0	IN	48.4	68.3	59.7	F		5.9	MPH
26.	May-26-2023	0	IN	46.8	75	61.24	F		4	MPH
27.	May-27-2023	0	IN	47.2	77	64.85	F		2.5	MPH
28.	May-28-2023	0	IN	57.6	79.6	68.81	F		0.5	MPH
29.	May-29-2023	0	IN	56.4	84.6	71.88	F		0.6	MPH
30.	May-30-2023	0	IN	58.7	87.1	75.14	F		1.3	MPH
31.	May-31-2023	0	IN	65.4	87.7	77.14	F		0.6	MPH
32.	Jun-1-2023	0	IN	64.6	89.2	77.42	F		1.6	MPH
33.	Jun-2-2023	0	IN	61	89.9	76.83	F		1.3	MPH
34.	Jun-3-2023	0	IN	63.1	89.9	78.15	F		1.2	MPH
35.	Jun-4-2023	0	IN	63.5	82	73.54	F		2.5	MPH
36.	Jun-5-2023	0	IN	54.1	78.8	67.66	F		1.6	MPH

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37.	Jun-6-2023	0	IN	53.7	85.5	69.23	F		0.1	MPH
38.	Jun-7-2023	0	IN	59.1	76.2	67.27	F		1	MPH
39.	Jun-8-2023	0	IN	45.9	76.6	62.87	F		0.6	MPH
40.	Jun-9-2023	0	IN	44.6	79.3	64.11	F		0.2	MPH
41.	Jun-10-2023	0	IN	56.5	84.1	71.38	F		1.3	MPH
42.	Jun-11-2023	0.76	IN	56.1	68.3	63.16	F		0.3	MPH
43.	Jun-12-2023	0	IN	51.5	67.7	58.29	F		0.7	MPH
44.	Jun-13-2023	0.03	IN	55	68.6	60.74	F		2.4	MPH
45.	Jun-14-2023	0.04	IN	56.9	76.7	66.76	F		0	MPH
46.	Jun-15-2023	0	IN	57.6	84.2	70.06	F		1.8	MPH
47.	Jun-16-2023	0	IN	50.8	71.7	60.86	F		0.4	MPH
48.	Jun-17-2023	0	IN	50.7	80.9	66.2	F		0	MPH
49.	Jun-18-2023	0	IN	57.3	82.5	70.7	F		1.2	MPH
50.	Jun-19-2023	0	IN	65.6	84	74.05	F		3.3	MPH
51.	Jun-20-2023	0	IN	63.8	86.9	74.64	F		4.4	MPH
52.	Jun-21-2023	0	IN	64.4	86	75.4	F		5.1	MPH
53.	Jun-22-2023	0	IN	61.1	81.1	71.33	F		2.4	MPH
54.	Jun-23-2023	0	IN	64.7	82.4	72.52	F		0	MPH
55.	Jun-24-2023	0	IN	59.3	89.2	75.93	F		0.2	MPH
56.	Jun-25-2023	1.16	IN	66.8	87.6	76.75	F		2.8	MPH
57.	Jun-26-2023	0	IN	65.4	74.7	70.53	F		4.3	MPH
58.	Jun-27-2023	0	IN	60.4	75.3	66.32	F		0.1	MPH
59.	Jun-28-2023	0	IN	52.6	79.7	66.17	F		0.4	MPH
60.	Jun-29-2023	0.82	IN	63.7	82.9	69.49	F		1.3	MPH
61.	Jun-30-2023	0.01	IN	62.4	83.8	73.03	F		0.6	MPH
62.	Jul-1-2023	0.48	IN	69	82.8	74.98	F		1.1	MPH
63.	Jul-2-2023	1.7	IN	67.7	81.4	72.16	F		1.2	MPH
64.	Jul-3-2023	0	IN	65.3	84.2	73.93	F		0.1	MPH
65.	Jul-4-2023	0	IN	64.4	88	76.25	F	7	0.3	MPH
66.	Jul-5-2023	0.07	IN	67.9	88.4	78.03	F	18	0.7	MPH
67.	Jul-6-2023	0.01	IN	68.8	82.9	74.17	F	11	0.6	MPH
68.	Jul-7-2023	0	IN	60.5	82.2	71.58	F	8	0.3	MPH
69.	Jul-8-2023	0.9	IN	62.8	74.6	68.13	F	12	0.2	MPH
70.	Jul-9-2023	0	IN	56.4	81	67.51	F	7	0.1	MPH
71.	Jul-10-2023	0	IN	57.6	81	70.65	F	10	0.8	MPH
72.	Jul-11-2023	0	IN	63.1	83.7	73.9	F	14	1.8	MPH
73.	Jul-12-2023	0	IN	69.8	84.4	76.47	F	17	0.7	MPH
74.	Jul-13-2023	0	IN	63.8	77.8	70.21	F	8	0.2	MPH
75.	Jul-14-2023	0	IN	59.6	87	73.92	F	9	0.5	MPH
76.	Jul-15-2023	1.68	IN	66.2	82.1	72.95	F	8	0.3	MPH
77.	Jul-16-2023	0	IN	62.5	81.3	71.73	F	12	1.3	MPH
78.	Jul-17-2023	0.15	IN	65.5	79.1	70.6	F	9	0.9	MPH
79.	Jul-18-2023	0	IN	62.7	79.7	70.75	F	5	0	MPH
80.	Jul-19-2023	0	IN	56.6	82.6	70.73	F	5	0	MPH
81.	Jul-20-2023	0	IN	67.9	84.8	75.5	F	14	0.7	MPH
82.	Jul-21-2023	0	IN	59.8	79.8	70.08	F	6	0	MPH
83.	Jul-22-2023	0	IN	57.3	81.5	69.38	F	6	0	MPH
84.	Jul-23-2023	0.01	IN	58.5	82.8	70.3	F	9	0.7	MPH
85.	Jul-24-2023	0	IN	62.5	84.7	73.5	F	4	0	MPH
86.	Jul-25-2023	0	IN	60.6	84.9	73.27	F	6	0.1	MPH
87.	Jul-26-2023	0.01	IN	68.9	87.5	78.15	F	12	1.1	MPH
88.	Jul-27-2023	0	IN	72.7	92	82.51	F	7	0.3	MPH

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89.	Jul-28-2023	1.2	IN	69.1	89.2	79.86	F	17	0.8	MPH
90.	Jul-29-2023	1.03	IN	68.4	83.1	75.48	F	9	0.4	MPH
91.	Jul-30-2023	0	IN	60.7	82.2	71.86	F	6	0.1	MPH
92.	Jul-31-2023	0	IN	56.2	77.8	67.7	F	6	0.3	MPH
93.	Aug-1-2023	0	IN	55.6	79.8	68.02	F	4	0	MPH
94.	Aug-2-2023	0	IN	59	80.5	70.02	F	6	0	MPH
95.	Aug-3-2023	0	IN	62.9	83.2	72.74	F	5	0	MPH
96.	Aug-4-2023	0	IN	60	86.2	73.91	F	4	0	MPH
97.	Aug-5-2023	0.85	IN	66.3	79.5	72.76	F	10	1	MPH
98.	Aug-6-2023	0.02	IN	63.3	75	68.31	F	12	1.7	MPH
99.	Aug-7-2023	0.21	IN	64.1	76.9	69.3	F	6	0.1	MPH
100.	Aug-8-2023	1.31	IN	60.4	80.2	68.38	F	13	0.5	MPH
101.	Aug-9-2023	0.68	IN	59.2	79.6	67.76	F	7	0	MPH
102.	Aug-10-2023	0.02	IN	63	79.5	70.32	F	10	0.6	MPH
103.	Aug-11-2023	0	IN	63.9	82.9	73.19	F	11	0.9	MPH
104.	Aug-12-2023	0.37	IN	66.5	83.9	74.98	F	14	1	MPH
105.	Aug-13-2023	0	IN	62.8	83.9	72.48	F	7	0.2	MPH
106.	Aug-14-2023	0.18	IN	66	74.7	69.23	F	10	0.5	MPH
107.	Aug-15-2023	0	IN	60.7	72.6	65.52	F	10	1	MPH
108.	Aug-16-2023	0	IN	54	78.2	66.45	F	6	0	MPH
109.	Aug-17-2023	0.38	IN	60.6	75.3	66.57	F	12	1.6	MPH
110.	Aug-18-2023	0	IN	52.7	75.8	64.65	F	8	0	MPH
111.	Aug-19-2023	0	IN	55	79.4	67	F	8	0.2	MPH
112.	Aug-20-2023	0	IN	63.4	86.2	75.11	F	7	0.1	MPH
113.	Aug-21-2023	0	IN	72.2	87.9	79.59	F	5	0.1	MPH
114.	Aug-22-2023	0	IN	70	85	76.8	F	7	0.5	MPH
115.	Aug-23-2023	0	IN	68.9	89.6	79.1	F	13	0.8	MPH
116.	Aug-24-2023	0	IN	76.5	91.8	83.8	F	13	1.3	MPH
117.	Aug-25-2023	0	IN	75.4	87.3	81.47	F	7	0.3	MPH
118.	Aug-26-2023	0	IN	68	83.4	75.1	F	9	0	MPH
119.	Aug-27-2023	0	IN	62.5	76.9	68.89	F	9	0.8	MPH
120.	Aug-28-2023	0	IN	54.1	77	64.85	F	7	0.3	MPH
121.	Aug-29-2023	0	IN	51.9	81.1	66.23	F	8	0.4	MPH
122.	Aug-30-2023	0	IN	55.5	73.1	64.73	F	10	0.3	MPH
123.	Aug-31-2023	0	IN	48.3	74.7	61.46	F	9	0.8	MPH
124.	Sep-1-2023	0	IN	50.6	81.1	65.47	F	7	0.1	MPH
125.	Sep-2-2023	0	IN	55.9	86.1	70.93	F	11	0.4	MPH

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Application Description

	A	B
Date	May-5-2023	Jun-5-2023
Start Time	8:08 PM	11:30 AM
Stop Time	8:32 PM	12:05 PM
Method	SPRAY	SPRAY
Timing	PRE	3-5" WEEDS
Placement	BROSOI	BROFOL
Applied By	M. ZIMMER	M. ZIMMER
Entry Date	May-24-2023	Jun-15-2023
Air Temperature Start, Stop	72, 72 F	70, 70 F
% Relative Humidity Start, Stop	41, 41	31, 31
Wind Velocity+Dir. Start	1.5 MPH, SE	1.6 MPH, NNE
Wind Velocity+Dir. Stop	1.4 MPH, SE	1.8 MPH, NNE
Wind Velocity+Dir. Max	2 MPH, SE	3 MPH, NNE
Wet Leaves (Y/N)	N, no	N, no
Soil Temperature	69 F	84 F
Soil Moisture	ADEQUATE	ADEQUATE
% Cloud Cover	30	90

Crop Stage At Each Application

	A	B
Crop 1 Code, BBCH Scale	ZEAMX, BCOR	ZEAMX, BCOR
Days after Emergence	-7	24
Stage Majority, Percent	00, -	V6, -
Stage Minimum, Percent	00, -	V5, -
Stage Maximum, Percent	00, -	V6, -
Height Average	0 IN	17 IN
Height Minimum, Maximum	0, 0	13, 22

Pest Stage At Each Application

	A	B
Pest 1 Code, Type, Scale	AMBTR, W, BBCH	AMBTR, W, BBCH
Height Average	0 IN	6 IN
Height Minimum, Maximum	0, 0	2, 12
Density Average	0 FT2	3 FT2
Density Minimum, Maximum	0, 0	0, 8
Pest 2 Code, Type, Scale	ECHCG, W, BBCH	ECHCG, W, BBCH
Height Average	0 IN	4 IN
Height Minimum, Maximum	0, 0	3, 6
Density Average	0 FT2	6 FT2
Density Minimum, Maximum	0, 0	0, 20
Pest 3 Code, Type, Scale	AMATU, W, BBCH	AMATU, W, BBCH
Height Average	0 IN	3 IN
Height Minimum, Maximum	0, 0	1, 4
Density Average	0 FT2	1 FT2
Density Minimum, Maximum	0, 0	0, 4

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Application Equipment

	A	B
Equipment Name	CO2 BACKPACK	CO2 BACKPACK
Equipment Type	BACSPR	BACSPR
Operation Pressure	20 PSI	21 PSI
Nozzle Model	XR	XR
Nozzle Type	FLAFXR	FLAFXR
Nozzle TradeName	TEEJET	TEEJET
Nozzle Tip Size, Color	8002, YELLOW	8002, YELLOW
Nozzle Spacing	20 IN	20.0 IN
Boom Length	6.67 FT	6.67 FT
Ground Speed	3 MPH	3 MPH
Carrier	WATER	WATER
Application Amount	15 GAL/AC	15 GAL/AC
Mix Size	1119.0 mL	1119.0 mL
Propellant	COMCO2	COMCO2

Notes

Context	Date	By	Notes
STATUS	Mar-20-2023	Dr. Bill Johnson	Automatically added by ARM: Trial Status updated to 'S' during trial creation.
STATUS	May-24-2023	Dr. Bryan Young	Automatically added by ARM: Status changed to: E: changed by (EINYOB).

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Assessed By	Claudia Bland	Claudia Bland	Claudia Bland	Claudia Bland	Claudia Bland			
Rating Date	May-26-2023	Jun-5-2023	Jun-12-2023	Jun-19-2023	May-26-2023			
Rating Type	PHYGEN	PHYGEN	PHYGEN	PHYGEN	CONTRO			
Rating Unit/Min/Max	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100			
Crop Type, Code	C, ZEAMX	C, ZEAMX	C, ZEAMX	C, ZEAMX	C, ZEAMX			
Crop Scientific Name	Zea mays	Zea mays	Zea mays	Zea mays	Zea mays			
Crop Name	Corn	Corn	Corn	Corn	Corn			
Pest Code					AMATU			
Pest Scientific Name					Amaranthus tube>			
Pest Name					tall waterhemp			
Rating Timing	14 DA-E	AT POST	7 DA-B	14 DA-B	21 DA-A			
ARM Action Codes	EC	EC	EC	EC	EC			
Trt No.	Treatment Name	Rate	Appl Code	1*	4*	7*	8*	2*
		Rate Unit						
1	NONTREATED		A	0.0	0.0	0.0	0.0	0.0
2	MOCCASIN II PLUS ROUNDUP POWERMAX 3 AMSOL	1 pt/a 20 fl oz/a 8.5 lb ai/100 gal	A B B	0.0 a	0.0 a	0.0 c	0.0 c	93.3 a
3	MOCCASIN II PLUS MOTIF ROUNDUP POWERMAX 3 AMSOL	1 pt/a 3 fl oz/a 20 fl oz/a 8.5 lb ai/100 gal	A B B B	0.0 a	0.0 a	3.8 ab	0.0 c	98.3 a
4	MOCCASIN II PLUS TOUGH MOTIF ROUNDUP POWERMAX 3 AMSOL	1 pt/a 8 fl oz/a 3 fl oz/a 20 fl oz/a 8.5 lb ai/100 gal	A B B B B	0.0 a	0.0 a	0.0 c	0.0 c	97.8 a
5	MOCCASIN II PLUS TOUGH R ROUNDUP POWERMAX 3 AMSOL	1 pt/a 16 fl oz/a 20 fl oz/a 8.5 lb ai/100 gal	A B B B	0.0 a	0.0 a	0.0 c	0.0 c	95.8 a
6	MOCCASIN II PLUS TOUGH R AATREX ROUNDUP POWERMAX 3 AMSOL	1 pt/a 16 fl oz/a 16 fl oz/a 20 fl oz/a 8.5 lb ai/100 gal	A B B B B	0.0 a	0.0 a	0.0 c	0.0 c	95.8 a
7	RESTRAINT AATREX SHIELDEX AATREX MSO ULTRA	36 fl oz/a 1 qt/a 1.35 fl oz/a 1 qt/a 1 % v/v	A A B B B	0.0 a	0.0 a	5.0 a	3.0 a	100.0 a
8	RESTRAINT AATREX SHIELDEX AATREX ROUNDUP POWERMAX 3 MSO ULTRA	36 fl oz/a 1 qt/a 1.35 fl oz/a 1 qt/a 20 fl oz/a 1 % v/v	A A B B B B	0.0 a	0.0 a	5.0 a	3.0 a	100.0 a
9	KFD-721-02 INTERMOC AMSOL	21 fl oz/a 64 fl oz/a 3 lb ai/a	A B B	0.0 a	0.0 a	5.0 a	1.5 b	98.3 a
10	KFD-721-02 KFD-273-04 INTERMOC AMSOL	21 fl oz/a 1.33 pt/a 64 fl oz/a 3 lb ai/a	A A B B	0.0 a	0.0 a	2.5 b	0.0 c	100.0 a
11	KFD-881-01 INTERMOC AMSOL	17 fl oz/a 64 fl oz/a 3 lb ai/a	A B B	0.0 a	0.0 a	5.0 a	0.0 c	100.0 a

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
 Due to missing data, larger LSD values (col. 13: >=26.596 and <=-28.913) are used for mean comparisons of treatment pairs with missing data.
 * Adjusted means
 Could not calculate LSD (% mean diff) for columns 1,4 because error mean square = 0.
 ^Calculated from residual.

Purdue Weed Science

Corn Herbicide Programs for Waterhemp Control

Trial ID: 23-MGS-Corn-02
 Protocol ID: 23-MGS-Corn-02 Location: Meigs Trial Year: 2023
 Study Director: Dr. Bill Johnson Sponsor Contact: Taylor Miller

Investigator: Dr. Bill Johnson

Assessed By	Claudia Bland						
Rating Date	May-26-2023	Jun-5-2023	Jun-12-2023	Jun-19-2023	May-26-2023		
Rating Type	PHYGEN	PHYGEN	PHYGEN	PHYGEN	CONTRO		
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100		
Crop Type, Code	C, ZEAMX	C, ZEAMX	C, ZEAMX	C, ZEAMX	C, ZEAMX		
Crop Scientific Name	Zea mays	Zea mays	Zea mays	Zea mays	Zea mays		
Crop Name	Corn	Corn	Corn	Corn	Corn		
Pest Code					AMATU		
Pest Scientific Name					Amaranthus tube>		
Pest Name					tall waterhemp		
Rating Timing	14 DA-E	AT POST	7 DA-B	14 DA-B	21 DA-A		
ARM Action Codes	EC	EC	EC	EC	EC		
Trt Treatment No. Name	Rate Rate Unit	Appl Code	1*	4*	7*	8*	2*
12 KFD-881-01	17 fl oz/a	A	0.0 a	0.0 a	0.0 c	0.0 c	100.0 a
KFD-273-04	1.33 pt/a	A					
INTERMOC	64 fl oz/a	B					
AMSOL	3 lb ai/a	B					
LSD P=.05			.	.	1.61	0.75	5.02
Standard Deviation			0.00	0.00	1.12	0.52	3.47
CV			0.0	0.0	46.85	76.59	3.54
Levene's Prob(F)			.	.	0.005*	0.00*	0.196
P(Shapiro-Wilk)^			.	.	0.0*	0.0*	0.0003*
P(Skewness)^			.	.	0.0291*	1.0	0.0018*
P(Kurtosis)^			.	.	0.0*	0.0*	0.0*
Replicate F			0.000	0.000	1.667	1.000	1.231
Replicate Prob(F)			1.0000	1.0000	0.1952	0.4064	0.3158
Treatment F			0.000	0.000	18.455	22.200	1.750
Treatment Prob(F)			1.0000	1.0000	0.0001	0.0001	0.1149

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Due to missing data, larger LSD values (col. 13: >=26.596 and <=-28.913) are used for mean comparisons of treatment pairs with missing data.

* Adjusted means

Could not calculate LSD (% mean diff) for columns 1,4 because error mean square = 0.

^Calculated from residual.

Purdue Weed Science

Corn Herbicide Programs for Waterhemp Control

Trial ID: 23-MGS-Corn-02
 Protocol ID: 23-MGS-Corn-02 Location: Meigs Trial Year: 2023
 Study Director: Dr. Bill Johnson Sponsor Contact: Taylor Miller

Investigator: Dr. Bill Johnson

Assessed By	Claudia Bland						
Rating Date	Jun-5-2023	Jun-19-2023	Jul-3-2023	May-26-2023			
Rating Type	CONTRO						
Rating Unit/Min/Max	%, 0, 100						
Crop Type, Code	C, ZEAMX						
Crop Scientific Name	Zea mays						
Crop Name	Corn						
Pest Code	AMATU						
Pest Scientific Name	Amaranthus tube>	Amaranthus tube>	Amaranthus tube>	Echinochloa cru>			
Pest Name	tall waterhemp	tall waterhemp	tall waterhemp	common barnyard>			
Rating Timing	AT POST	14 DA-B	28 DA-B	21 DA-A			
ARM Action Codes	EC	EC	EC	EC			
Trt No.	Treatment Name	Rate	Appl Code	5*	9*	11*	3*
		Rate Unit					
1	NONTREATED			0.0	0.0	0.0	0.0
2	MOCCASIN II PLUS ROUNDUP POWERMAX 3 AMSOL	1 pt/a 20 fl oz/a 8.5 lb ai/100 gal	A B B	70.0 b	20.0 c	15.0 e	100.0 a
3	MOCCASIN II PLUS MOTIF ROUNDUP POWERMAX 3 AMSOL	1 pt/a 3 fl oz/a 20 fl oz/a 8.5 lb ai/100 gal	A B B B	76.3 b	80.0 b	76.3 d	99.5 a
4	MOCCASIN II PLUS TOUGH MOTIF ROUNDUP POWERMAX 3 AMSOL	1 pt/a 8 fl oz/a 3 fl oz/a 20 fl oz/a 8.5 lb ai/100 gal	A B B B B	75.0 b	85.0 b	76.3 d	99.5 a
5	MOCCASIN II PLUS TOUGH R ROUNDUP POWERMAX 3 AMSOL	1 pt/a 16 fl oz/a 20 fl oz/a 8.5 lb ai/100 gal	A B B B	78.8 b	85.0 b	82.5 cd	100.0 a
6	MOCCASIN II PLUS TOUGH R AATREX ROUNDUP POWERMAX 3 AMSOL	1 pt/a 16 fl oz/a 16 fl oz/a 20 fl oz/a 8.5 lb ai/100 gal	A B B B B	70.0 b	93.3 a	88.0 bc	100.0 a
7	RESTRAINT AATREX SHIELDEX AATREX MSO ULTRA	36 fl oz/a 1 qt/a 1.35 fl oz/a 1 qt/a 1 % v/v	A A B B B	99.5 a	100.0 a	98.5 a	100.0 a
8	RESTRAINT AATREX SHIELDEX AATREX ROUNDUP POWERMAX 3 MSO ULTRA	36 fl oz/a 1 qt/a 1.35 fl oz/a 1 qt/a 20 fl oz/a 1 % v/v	A A B B B B	100.0 a	100.0 a	100.0 a	100.0 a
9	KFD-721-02 INTERMOC AMSOL	21 fl oz/a 64 fl oz/a 3 lb ai/a	A B B	92.5 a	99.3 a	96.3 ab	89.5 b
10	KFD-721-02 KFD-273-04 INTERMOC AMSOL	21 fl oz/a 1.33 pt/a 64 fl oz/a 3 lb ai/a	A A B B	100.0 a	99.5 a	98.8 a	100.0 a
11	KFD-881-01 INTERMOC AMSOL	17 fl oz/a 64 fl oz/a 3 lb ai/a	A B B	100.0 a	100.0 a	98.3 a	80.0 c

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
 Due to missing data, larger LSD values (col. 13: >=26.596 and <=28.913) are used for mean comparisons of treatment pairs with missing data.
 * Adjusted means
 Could not calculate LSD (% mean diff) for columns 1,4 because error mean square = 0.
 ^Calculated from residual.

Purdue Weed Science

Corn Herbicide Programs for Waterhemp Control

Trial ID: 23-MGS-Corn-02
 Protocol ID: 23-MGS-Corn-02 Location: Meigs Trial Year: 2023
 Study Director: Dr. Bill Johnson Sponsor Contact: Taylor Miller

Investigator: Dr. Bill Johnson

Assessed By			Claudia Bland	Claudia Bland	Claudia Bland	Claudia Bland
Rating Date			Jun-5-2023	Jun-19-2023	Jul-3-2023	May-26-2023
Rating Type			CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit/Min/Max			%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Crop Type, Code			C, ZEAMX	C, ZEAMX	C, ZEAMX	C, ZEAMX
Crop Scientific Name			Zea mays	Zea mays	Zea mays	Zea mays
Crop Name			Corn	Corn	Corn	Corn
Pest Code			AMATU	AMATU	AMATU	ECHCG
Pest Scientific Name			Amaranthus tube>	Amaranthus tube>	Amaranthus tube>	Echinochloa cru>
Pest Name			tall waterhemp	tall waterhemp	tall waterhemp	common barnyard>
Rating Timing			AT POST	14 DA-B	28 DA-B	21 DA-A
ARM Action Codes			EC	EC	EC	EC
Trt Treatment		Rate	5*	9*	11*	3*
No. Name		Rate Unit				
12 KFD-881-01		17 fl oz/a	100.0 a	100.0 a	99.8 a	99.5 a
KFD-273-04		1.33 pt/a				
INTERMOC		64 fl oz/a				
AMSOL		3 lb ai/a				
LSD P=.05			9.37	8.13	8.51	5.85
Standard Deviation			6.49	5.63	5.89	4.05
CV			7.42	6.44	6.98	4.18
Levene's Prob(F)			0.062	0.007*	0.048*	0.00*
P(Shapiro-Wilk)^			0.0056*	0.0579	0.0608	0.0*
P(Skewness)^			0.9411	0.9423	0.0262*	0.3294
P(Kurtosis)^			0.0005*	0.1399	0.046*	0.0*
Replicate F			0.804	2.130	1.787	0.586
Replicate Prob(F)			0.5014	0.1173	0.1708	0.6287
Treatment F			16.766	70.286	71.174	10.170
Treatment Prob(F)			0.0001	0.0001	0.0001	0.0001

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Due to missing data, larger LSD values (col. 13: >=26.596 and <=28.913) are used for mean comparisons of treatment pairs with missing data.

* Adjusted means

Could not calculate LSD (% mean diff) for columns 1,4 because error mean square = 0.

^Calculated from residual.

Purdue Weed Science

Corn Herbicide Programs for Waterhemp Control

Trial ID: 23-MGS-Corn-02
 Protocol ID: 23-MGS-Corn-02 Location: Meigs Trial Year: 2023
 Study Director: Dr. Bill Johnson Sponsor Contact: Taylor Miller

Investigator: Dr. Bill Johnson

Assessed By				Claudia Bland	Claudia Bland	Claudia Bland	Lucas Maia
Rating Date				Jun-5-2023	Jun-19-2023	Jul-3-2023	Oct-8-2023
Rating Type				CONTRO	CONTRO	CONTRO	YIELD
Rating Unit/Min/Max				% , 0, 100	% , 0, 100	% , 0, 100	bu/ac, -, -
Crop Type, Code				C, ZEAMX	C, ZEAMX	C, ZEAMX	
Crop Scientific Name				Zea mays	Zea mays	Zea mays	
Crop Name				Corn	Corn	Corn	
Pest Code				ECHCG	ECHCG	ECHCG	
Pest Scientific Name				Echinochloa cru>	Echinochloa cru>	Echinochloa cru>	
Pest Name				common barnyard>	common barnyard>	common barnyard>	
Rating Timing				AT POST	14 DA-B	28 DA-B	
ARM Action Codes				EC	EC	EC	
Trt No.	Treatment Name	Rate	Appl Code	6*	10*	12*	13*
		Rate Unit					
1	NONTREATED			0.0	0.0	0.0	79.78 d
2	MOCCASIN II PLUS	1 pt/a	A	100.0 a	100.0 a	97.3 a	184.50 bc
	ROUNDUP POWERMAX 3	20 fl oz/a	B				
	AMSOL	8.5 lb ai/100 gal	B				
3	MOCCASIN II PLUS	1 pt/a	A	98.3 a	99.5 a	100.0 a	181.00 c
	MOTIF	3 fl oz/a	B				
	ROUNDUP POWERMAX 3	20 fl oz/a	B				
	AMSOL	8.5 lb ai/100 gal	B				
4	MOCCASIN II PLUS	1 pt/a	A	97.5 a	99.5 a	100.0 a	186.50 bc
	TOUGH	8 fl oz/a	B				
	MOTIF	3 fl oz/a	B				
	ROUNDUP POWERMAX 3	20 fl oz/a	B				
	AMSOL	8.5 lb ai/100 gal	B				
5	MOCCASIN II PLUS	1 pt/a	A	99.5 a	100.0 a	98.8 a	196.25 abc
	TOUGH R	16 fl oz/a	B				
	ROUNDUP POWERMAX 3	20 fl oz/a	B				
	AMSOL	8.5 lb ai/100 gal	B				
6	MOCCASIN II PLUS	1 pt/a	A	100.0 a	100.0 a	97.5 a	202.25 abc
	TOUGH R	16 fl oz/a	B				
	AATREX	16 fl oz/a	B				
	ROUNDUP POWERMAX 3	20 fl oz/a	B				
	AMSOL	8.5 lb ai/100 gal	B				
7	RESTRAINT	36 fl oz/a	A	97.0 a	100.0 a	95.3 ab	210.50 ab
	AATREX	1 qt/a	A				
	SHIELDEX	1.35 fl oz/a	B				
	AATREX	1 qt/a	B				
	MSO ULTRA	1 % v/v	B				
8	RESTRAINT	36 fl oz/a	A	95.0 a	98.8 a	96.3 a	215.75 a
	AATREX	1 qt/a	A				
	SHIELDEX	1.35 fl oz/a	B				
	AATREX	1 qt/a	B				
	ROUNDUP POWERMAX 3	20 fl oz/a	B				
	MSO ULTRA	1 % v/v	B				
9	KFD-721-02	21 fl oz/a	A	81.3 b	93.3 b	87.3 b	195.50 abc
	INTERMOC	64 fl oz/a	B				
	AMSOL	3 lb ai/a	B				
10	KFD-721-02	21 fl oz/a	A	100.0 a	100.0 a	100.0 a	199.00 abc
	KFD-273-04	1.33 pt/a	A				
	INTERMOC	64 fl oz/a	B				
	AMSOL	3 lb ai/a	B				
11	KFD-881-01	17 fl oz/a	A	47.5 c	88.8 c	77.5 c	197.25 abc
	INTERMOC	64 fl oz/a	B				
	AMSOL	3 lb ai/a	B				

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Due to missing data, larger LSD values (col. 13: >=26.596 and <=28.913) are used for mean comparisons of treatment pairs with missing data.

* Adjusted means

Could not calculate LSD (% mean diff) for columns 1,4 because error mean square = 0.

^Calculated from residual.

Purdue Weed Science

Corn Herbicide Programs for Waterhemp Control

Trial ID: 23-MGS-Corn-02
 Protocol ID: 23-MGS-Corn-02 Location: Meigs Trial Year: 2023
 Study Director: Dr. Bill Johnson Sponsor Contact: Taylor Miller

Investigator: Dr. Bill Johnson

Assessed By			Claudia Bland	Claudia Bland	Claudia Bland	Lucas Maia
Rating Date			Jun-5-2023	Jun-19-2023	Jul-3-2023	Oct-8-2023
Rating Type			CONTRO	CONTRO	CONTRO	YIELD
Rating Unit/Min/Max			% , 0, 100	% , 0, 100	% , 0, 100	bu/ac, -, -
Crop Type, Code			C, ZEAMX	C, ZEAMX	C, ZEAMX	
Crop Scientific Name			Zea mays	Zea mays	Zea mays	
Crop Name			Corn	Corn	Corn	
Pest Code			ECHCG	ECHCG	ECHCG	
Pest Scientific Name			Echinochloa cru>	Echinochloa cru>	Echinochloa cru>	
Pest Name			common barnyard>	common barnyard>	common barnyard>	
Rating Timing			AT POST	14 DA-B	28 DA-B	
ARM Action Codes			EC	EC	EC	
Trt Treatment	Rate	Appl	6*	10*	12*	13*
No. Name	Rate Unit	Code				
12 KFD-881-01	17 fl oz/a	A	99.5 a	98.8 a	97.0 a	192.80 abc
KFD-273-04	1.33 pt/a	A				
INTERMOC	64 fl oz/a	B				
AMSOL	3 lb ai/a	B				
LSD P=.05			7.66	2.66	8.70	26.596
Standard Deviation			5.30	1.84	6.03	18.465
CV			5.74	1.88	6.33	9.89
Levene's Prob(F)			0.00*	0.072	0.00*	0.856
P(Shapiro-Wilk)^			0.0051*	0.0001*	0.04*	0.3679
P(Skewness)^			0.5433	0.4772	0.1481	0.2852
P(Kurtosis)^			0.0136*	0.0004*	0.0052*	0.7665
Replicate F			0.186	0.725	0.459	3.244
Replicate Prob(F)			0.9048	0.5453	0.7126	0.0347
Treatment F			35.590	15.789	5.198	14.505
Treatment Prob(F)			0.0001	0.0001	0.0002	0.0001

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
 Due to missing data, larger LSD values (col. 13: >=26.596 and <=28.913) are used for mean comparisons of treatment pairs with missing data.
 * Adjusted means
 Could not calculate LSD (% mean diff) for columns 1,4 because error mean square = 0.
 ^Calculated from residual.

Purdue Weed Science

Corn Herbicide Programs for Waterhemp Control

Trial ID: 23-MGS-Corn-02
Protocol ID: 23-MGS-Corn-02 Location: Meigs Trial Year: 2023
Study Director: Dr. Bill Johnson Sponsor Contact: Taylor Miller

Investigator: Dr. Bill Johnson

Rating Type

PHYGEN = phytotoxicity - general / injury

CONTRO = control / burndown or knockdown

YIELD = yield

Rating Unit/Min/Max

%, 0, 100 = percent

bu/ac, , = bushels per acre

Crop Type Code

C = EPPO species (Bayer) codes

ZEAMX, BCOR, Zea mays, Corn = US

Pest Code

AMATU, Amaranthus tuberculatus, tall waterhemp = US

ECHCG, Echinochloa crus-galli, common barnyardgrass = US

ARM Action Codes

EC = Do not analyze untreated check, while still reporting treatment mean on AOV Means Table