

Purdue University Weed Science

Belchim Evaluation of TOUGH and HPPD Herbicides for Waterhemp Control in Corn

Trial ID: 22S-MGS-CORN-02 Cooperator Trial ID:
 Protocol ID: 22S-MGS-CORN-02 Location: MEIGS Trial Year: 2022
 Project ID: Project ID 2: Project ID 3:
 Study Director: Brent Mansfield Sponsor Contact: Dennis Long - Belchim
 Investigator (Creator): Dr. Bill Johnson

General Trial Information

Study Director: Brent Mansfield **Title:** Research Associate
Investigator: Dr. Bill Johnson **Title:** Professor

Discipline: H herbicide
Status: E established
ARM Trial Created On: May-7-2022 **Reliability:** 1 usable data
Initiation Date: May-11-2022

Trial Location

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

Latitude of LL Corner °: 40.27095 N
Longitude of LL Corner °: -86.8800833 W

Conducted Under GLP: No
Conducted Under GEP: No

Contacts

Role: STYDIR study director
Study Director: Brent Mansfield **Title:** Research Associate
Organization: Purdue University
Address 1: 915 W. State Street
Country: USA United States **E-mail:** brentmansfield@purdue.edu
City: West Lafayette **State/Prov:** IN **Postal Code:** 47907
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: Dennis Long - Belchim
Role: COOPER cooperater
Cooperator: Jay Young **Title:** Superintendent
Organization: Purdue University
Address 1: 8343 US 231 S **Phone No.:** 765-538-3422
City: Lafayette **State/Prov:** IN **Fax No.:** 765-538-3423
Country: USA United States **E-mail:** jayyoung@purdue.edu
City: Lafayette **State/Prov:** IN **Postal Code:** 47909

Crop Description

Crop 1: C ZEAMX Zea mays Corn **BBCH Scale:** BCOR
Entry Date: Jun-22-2022 **Stage Scale:** BBCH
Variety: DKC 56-65
Attributes: Glyphosate-R and Glufosinate-R
Planting Date: May-11-2022 **Planting Rate:** 32000 S/A
Depth: 1.5 IN
Rows per Plot: 4 **Planting Method:** PLANTD planted
Row Spacing: 30 IN **Planting Equipment:** PP plot planter
Soil Temperature: 83 F **Soil Moisture:** NORMAL normal, adequate
Emergence Date: May-17-2022

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Belchim Evaluation of TOUGH and HPPD Herbicides for Waterhemp Control in Corn

Trial ID: 22S-MGS-CORN-02 Cooperator Trial ID:
 Protocol ID: 22S-MGS-CORN-02 Location: MEIGS Trial Year: 2022
 Project ID: Project ID 2: Project ID 3:
 Study Director: Brent Mansfield Sponsor Contact: Dennis Long - Belchim
 Investigator (Creator): Dr. Bill Johnson

Pest Description

Pest 1 Type: W Code: AMATA <i>Amaranthus x tamariscinus</i> Common Name: common water hemp Attributes: Glyphosate-R and PPO-R	Entry Date: Jun-22-2022 Stage Scale: BBCH
Pest 2 Type: W Code: AMBTR <i>Ambrosia trifida</i> Common Name: Giant ragweed	Entry Date: Jun-22-2022 Stage Scale: BBCH
Pest 3 Type: W Code: ABUTH <i>Abutilon theophrasti</i> Common Name: velvetleaf	Entry Date: Jun-22-2022 Stage Scale: BBCH
Pest 4 Type: W Code: CHEAL <i>Chenopodium album</i> Common Name: common lambsquarters	Entry Date: Jun-22-2022 Stage Scale: BBCH
Pest 5 Type: W Code: SETFA <i>Setaria faberi</i> Common Name: Giant foxtail	Entry Date: Jun-22-2022 Stage Scale: BBCH
Pest 6 Type: W Code: SIDSP <i>Sida spinosa</i> Common Name: Prickly sida	Entry Date: Jun-22-2022 Stage Scale: BBCH

Site and Design

Treated Plot Width: 6.67 FT Treated Plot Length: 25 FT Treated Plot Area: 166.75 FT ² Replications: 4 Treatments: 12 Plots: 48	Site Type: FIELD field Experimental Unit: 1 PLOT plot Tillage Type: NOTILL no-till Study Design: RACOB Randomized Complete Block (RCB)
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Field Prep./Maintenance:

180 lbs of N applied as Urea on 5/16/22

Nontreated checks were sprayed with glyphosate to control giant ragweed

Soil Description

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

No.	Date	Moisture Total	Unit	Min Temp	Max Temp	Temp Unit
1.	May-1-2022	0	IN	51.1	63.7	F
2.	May-2-2022	0	IN	43.2	66	F
3.	May-3-2022	0.71	IN	46	67.8	F
4.	May-4-2022	0	IN	46	61.5	F
5.	May-5-2022	0.66	IN	53.6	56.7	F
6.	May-6-2022	0.07	IN	51.8	57.2	F
7.	May-7-2022	0	IN	48.7	68.2	F
8.	May-8-2022	0	IN	44.6	68.7	F
9.	May-9-2022	0	IN	52.9	81	F
10.	May-10-2022	0	IN	66.6	88.9	F
11.	May-11-2022	0	IN	73	92.3	F
12.	May-12-2022	0	IN	67.8	90	F
13.	May-13-2022	0	IN	61.9	89.6	F
14.	May-14-2022	0.74	IN	59.7	88.2	F
15.	May-15-2022	1.02	IN	57	86.2	F
16.	May-16-2022	0.01	IN	52.7	76.8	F
17.	May-17-2022	0	IN	53.4	77.7	F
18.	May-18-2022	0.1	IN	57.9	66.9	F
19.	May-19-2022	0	IN	59.7	82.2	F
20.	May-20-2022	0	IN	66.4	86.9	F
21.	May-21-2022	0.1	IN	58.3	77.7	F

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22.	May-22-2022	0	IN	53.2	64.6	F
23.	May-23-2022	0	IN	48.4	68.7	F
24.	May-24-2022	0	IN	50.2	75.6	F
25.	May-25-2022	0.05	IN	61.7	85.6	F
26.	May-26-2022	1.68	IN	60.8	75.4	F
27.	May-27-2022	0.03	IN	53.4	67.8	F
28.	May-28-2022	0	IN	51.6	73.2	F
29.	May-29-2022	0	IN	59.5	82.9	F
30.	May-30-2022	0	IN	67.1	88.5	F
31.	May-31-2022	0	IN	71.6	89.4	F
32.	Jun-1-2022	0	IN	66	81	F
33.	Jun-2-2022	0.01	IN	61.3	79.9	F
34.	Jun-3-2022	0	IN	54.1	84.2	F
35.	Jun-4-2022	0	IN	51.4	84.2	F
36.	Jun-5-2022	0	IN	56.8	85.3	F
37.	Jun-6-2022	0	IN	64	85.8	F
38.	Jun-7-2022	0	IN	62.2	77.9	F
39.	Jun-8-2022	0.02	IN	55.2	77.5	F
40.	Jun-9-2022	0	IN	56.7	78.8	F
41.	Jun-10-2022	0.1	IN	54	79.7	F
42.	Jun-11-2022	0.23	IN	58.5	79.7	F
43.	Jun-12-2022	0.02	IN	65.8	84	F
44.	Jun-13-2022	0	IN	68.7	91	F
45.	Jun-14-2022	0	IN	74.8	95.5	F
46.	Jun-15-2022	0	IN	75	94.6	F
47.	Jun-16-2022	0	IN	76.6	97.3	F
48.	Jun-17-2022	0	IN	69.1	88.2	F
49.	Jun-18-2022	0	IN	60.8	82.2	F
50.	Jun-19-2022	0	IN	52.2	83.8	F
51.	Jun-20-2022	0	IN	57.4	90.1	F
52.	Jun-21-2022	0	IN	63.9	96.3	F
53.	Jun-22-2022	0	IN	72	90.3	F
54.	Jun-23-2022	0	IN	62.4	89.1	F
55.	Jun-24-2022	0	IN	59	93	F
56.	Jun-25-2022	0.01	IN	63.9	82.6	F
57.	Jun-26-2022	0.22	IN	64.2	81.5	F
58.	Jun-27-2022	0	IN	54.7	79.3	F
59.	Jun-28-2022	0	IN	55.2	82.9	F
60.	Jun-29-2022	0	IN	57.6	87.3	F
61.	Jun-30-2022	0	IN	61	90.5	F
62.	Jul-1-2022	0	IN	68.5	90.7	F
63.	Jul-2-2022	0	IN	66.6	86.4	F
64.	Jul-3-2022	0	IN	57.6	89.8	F
65.	Jul-4-2022	0.01	IN	64.6	91.4	F
66.	Jul-5-2022	0	IN	77.2	98.2	F
67.	Jul-6-2022	0	IN	74.3	90	F
68.	Jul-7-2022	0.05	IN	70.3	84.7	F
69.	Jul-8-2022	0.23	IN	70	76.3	F
70.	Jul-9-2022	0	IN	67.5	84.6	F
71.	Jul-10-2022	0	IN	57.9	90.7	F
72.	Jul-11-2022	0	IN	59.5	88	F
73.	Jul-12-2022	0	IN	67.6	83.8	F
74.	Jul-13-2022	0	IN	62.8	86.5	F

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75.	Jul-14-2022	0	IN	57.4	84.9	F
76.	Jul-15-2022	0.1	IN	58.1	77.4	F
77.	Jul-16-2022	0.49	IN	69.6	89.4	F
78.	Jul-17-2022	0.47	IN	68.9	76.3	F
79.	Jul-18-2022	0	IN	68.9	87.6	F

Application Description

	A	B
Application Date	May-11-2022	Jun-9-2022
Appl. Start Time	4:20 PM	9:35 AM
Appl. Stop Time	4:32 PM	10:05 AM
Interval to Prev. Appl.		29 DAYS
Application Method	SPRAY	SPRAY
Application Timing	PRE	3-5" WEEDS
Application Placement	BROSOI	BROFOL
Applied By	M. ZIMMER	J. HAARMANN
Appl. Entry Date	Jun-22-2022	Jun-22-2022
Air Temperature Start, Stop	92, 92 F	64, 64 F
% Relative Humidity Start, Stop	45, 45	65, 65
Wind Velocity+Dir. Start	7 MPH, SE	2 MPH, N
Wind Velocity+Dir. Stop		3 MPH, N
Wind Velocity+Dir. Max		7 MPH, N
Wet Leaves (Y/N)	N, no	N, no
Soil Temperature	83 F	65 F
Soil Moisture	NORMAL	NORMAL
% Cloud Cover	50	0

Crop Stage At Each Application

	A	B
Crop 1 Code, BBCH Scale	ZEAMX, BCOR	ZEAMX, BCOR
Days after Emergence	-6	23
Stage Majority, Percent	00, -	V5, -
Stage Minimum, Percent	00, -	V4, -
Stage Maximum, Percent	00, -	V5, -
Height Average	0 IN	12 IN

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Pest Stage At Each Application

	A	B
Pest 1 Code, Type, Scale	AMATA, W, BBCH	AMATA, W, BBCH
Height Average	0 IN	3 IN
Height Minimum, Maximum		2, 5
Density Average	0 FT2	3 FT2
Density Minimum, Maximum		1, 5
Pest 2 Code, Type, Scale	AMBTR, W, BBCH	AMBTR, W, BBCH
Height Average	0 IN	12 IN
Height Minimum, Maximum		4, 20
Density Average	0 FT2	10 FT2
Density Minimum, Maximum		2, 20
Pest 3 Code, Type, Scale	ABUTH, W, BBCH	ABUTH, W, BBCH
Height Average	0 IN	4 IN
Height Minimum, Maximum		3, 6
Density Average	0 FT2	5 FT2
Density Minimum, Maximum		1, 8
Pest 4 Code, Type, Scale	CHEAL, W, BBCH	CHEAL, W, BBCH
Height Average	0 IN	3 IN
Height Minimum, Maximum		0.25, 6
Density Average	0 FT2	3 FT2
Density Minimum, Maximum		0, 5
Pest 5 Code, Type, Scale	SETFA, W, BBCH	SETFA, W, BBCH
Height Average	0 IN	0.5 IN
Height Minimum, Maximum		0, 1
Density Average	0 FT2	1 FT2
Density Minimum, Maximum		0, 1
Pest 6 Code, Type, Scale	SIDSP, W, BBCH	SIDSP, W, BBCH
Height Average	0 IN	4 IN
Height Minimum, Maximum		3, 6
Density Average	0 FT2	5 FT2
Density Minimum, Maximum		1, 8

Application Equipment

	A	B
Appl. Equipment	CO2 BACKPACK	CO2 BACKPACK
Equipment Type	BACSPR	BACSPR
Operation Pressure	30 PSI	30 PSI
Nozzle Model	XR	TT
Nozzle Type	FLAFXR	TEEJTU
Nozzle TradeName	TEEJET	TEEJET
Nozzle Tip Size, Color	80015, GREEN	110015, GREEN
Nozzle Spacing	20 IN	20 IN
Nozzles/Row	4	4
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	945 mL	945 mL
Propellant	COMCO2	COMCO2

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Notes			
Context	Date	By	Notes
STATUS	May-7-2022	Dr. Bill Johnson	Automatically added by ARM: Trial Status updated to 'S' during trial creation.
STATUS	Jun-22-2022	Dr. Bill Johnson	Automatically added by ARM: Trial Status changed to: E: changed by (EINJOW).
STATUS	Jun-22-2022	Dr. Bill Johnson	Automatically added by ARM: Trial Status updated to 'E' when Initiation Date entered.

	W, Weed AMATA Amaranthus x ta> common water he>	W, Weed AMBTR Ambrosia trifida Giant ragweed	W, Weed C, ZEAMX BCOR Zea mays Corn	W, Weed AMATA Amaranthus x ta> common water he>	W, Weed AMBTR Ambrosia trifida Giant ragweed		
Pest Type							
Pest Code							
Pest Scientific Name							
Pest Name							
Crop Type, Code							
BBCH Scale							
Crop Scientific Name							
Crop Name							
Rating Date	Jun-17-2022	Jun-17-2022	Jun-17-2022	Jun-23-2022	Jun-23-2022		
Part Rated	PLOT, P	PLOT, P	PLOT, P	PLOT, P	PLOT, P		
Rating Type	CONTRO	CONTRO	PHYGEN	CONTRO	CONTRO		
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100		
Number of Subsamples	0	0	1	0	0		
Data Entry Date	Jul-19-2022	Jul-19-2022	Jul-19-2022	Jul-20-2022	Jul-20-2022		
Rating Timing	8 DAB	8 DAB	8 DAB	14 DAB	14 DAB		
Days After First/Last Applic.	37, 8	37, 8	37, 8	43, 14	43, 14		
Trt-Eval Interval	8 DA-B	8 DA-B	8 DA-B	14 DA-B	14 DA-B		
Plant-Eval Interval	37 DP-1	37 DP-1	37 DP-1	43 DP-1	43 DP-1		
Days After Emergence	31 DE-1	31 DE-1	31 DE-1	37 DE-1	37 DE-1		
Number of Decimals	0	0	0	0	0		
Trt Treatment No. Name	Rate Unit	Appl Code	1	2	3	4	5
1 DUAL II MAGNUM	0.75 pt/a	A	23 b	76 -	0 -	16 c	80 e
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
2 DUAL II MAGNUM	0.75 pt/a	A	85 a	83 -	0 -	91 ab	89 cd
CALLISTO	2.25 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
3 DUAL II MAGNUM	0.75 pt/a	A	86 a	88 -	0 -	89 b	90 bcd
TOUGH R (BCP1016H)	12 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
4 DUAL II MAGNUM	0.75 pt/a	A	85 a	81 -	0 -	91 ab	90 bcd
CALLISTO	3 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
5 DUAL II MAGNUM	0.75 pt/a	A	88 a	86 -	0 -	89 b	93 abc
TOUGH	8 fl oz/a	B					
CALLISTO	3 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
6 DUAL II MAGNUM	0.75 pt/a	A	88 a	86 -	0 -	90 ab	94 ab
TOUGH R (BCP1016H)	16 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
7 DUAL II MAGNUM	0.75 pt/a	A	89 a	90 -	0 -	91 ab	95 a
TOUGH R (BCP1016H)	16 fl oz/a	B					
AATREX	1 pt/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
8 DUAL II MAGNUM	0.75 pt/a	A	85 a	84 -	0 -	90 ab	89 cd
TOUGH	6 fl oz/a	B					
LAUDIS	3 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					

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Pest Type	W, Weed AMATA	W, Weed AMBTR	W, Weed	W, Weed AMATA	W, Weed AMBTR		
Pest Code	Amaranthus x ta>	Ambrosia trifida		Amaranthus x ta>	Ambrosia trifida		
Pest Scientific Name	common water he>	Giant ragweed		common water he>	Giant ragweed		
Pest Name							
Crop Type, Code			C, ZEAMX				
BBCH Scale			BCOR				
Crop Scientific Name			Zea mays				
Crop Name			Corn				
Rating Date	Jun-17-2022	Jun-17-2022	Jun-17-2022	Jun-23-2022	Jun-23-2022		
Part Rated	PLOT, P	PLOT, P	PLOT, P	PLOT, P	PLOT, P		
Rating Type	CONTRO	CONTRO	PHYGEN	CONTRO	CONTRO		
Rating Unit/Min/Max	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100		
Number of Subsamples	0	0	1	0	0		
Data Entry Date	Jul-19-2022	Jul-19-2022	Jul-19-2022	Jul-20-2022	Jul-20-2022		
Rating Timing	8 DAB	8 DAB	8 DAB	14 DAB	14 DAB		
Days After First/Last Applic.	37, 8	37, 8	37, 8	43, 14	43, 14		
Trt-Eval Interval	8 DA-B	8 DA-B	8 DA-B	14 DA-B	14 DA-B		
Plant-Eval Interval	37 DP-1	37 DP-1	37 DP-1	43 DP-1	43 DP-1		
Days After Emergence	31 DE-1	31 DE-1	31 DE-1	37 DE-1	37 DE-1		
Number of Decimals	0	0	0	0	0		
Trt Treatment	1	2	3	4	5		
No. Name							
Rate							
Rate Unit							
Appl Code							
9 DUAL II MAGNUM	0.75 pt/a	A	86 a	86 -	0 -	95 a	90 bcd
TOUGH	8 fl oz/a	B					
LAUDIS	3 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
10 DUAL II MAGNUM	0.75 pt/a	A	83 a	81 -	0 -	90 ab	86 d
IMPACT	1 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
11 DUAL II MAGNUM	0.75 pt/a	A	84 a	84 -	0 -	90 ab	90 bcd
TOUGH	8 fl oz/a	B					
IMPACT	1 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
12 NONTREATED			0	0	0	0	0
LSD P=.05	8.9	7.9	.	4.9	4.5		
Standard Deviation	6.2	5.5	0.0	3.4	3.1		
CV	7.73	6.53	0.0	4.02	3.5		
Levene's F^	3.492*	0.808	.	3.694*	1.637		
Levene's Prob(F)	0.003*	0.623	.	0.002*	0.139		
Shapiro-Wilk^	0.9155*	0.9734	.	0.9542	0.9363*		
P(Shapiro-Wilk)^	0.0034*	0.3979	.	0.0786	0.0174*		
Skewness^	0.3162	-0.3616	.	0.4106	-0.3239		
P(Skewness)^	0.3969	0.3334	.	0.2727	0.3857		
Kurtosis^	3.5274*	0.5253	.	2.147*	3.4071*		
P(Kurtosis)^	0.0*	0.4729	.	0.005*	0.0*		
Replicate F	0.673	3.266	0.000	0.743	3.538		
Replicate Prob(F)	0.5752	0.0349	1.0000	0.5350	0.0263		
Treatment F	38.358	1.869	0.000	178.002	6.508		
Treatment Prob(F)	0.0001	0.0905	1.0000	0.0001	0.0001		

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Pest Type	W, Weed	W, Weed	W, Weed	W, Weed	W, Weed		
Pest Code	ABUTH	SETFA		AMATA	AMBTR		
Pest Scientific Name	Abutilon theoph>	Setaria faberi		Amaranthus x ta>	Ambrosia trifida		
Pest Name	velvetleaf	Giant foxtail		common water he>	Giant ragweed		
Crop Type, Code			C, ZEAMX				
BBCH Scale			BCOR				
Crop Scientific Name			Zea mays				
Crop Name			Corn				
Rating Date	Jun-23-2022	Jun-23-2022	Jun-23-2022	Jul-7-2022	Jul-7-2022		
Part Rated	PLOT, P	PLOT, P	PLOT, P	PLOT, P	PLOT, P		
Rating Type	CONTRO	CONTRO	PHYGEN	CONTRO	CONTRO		
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100		
Number of Subsamples	0	0	1	0	0		
Data Entry Date	Jul-20-2022	Jul-20-2022	Jul-20-2022	Jul-20-2022	Jul-20-2022		
Rating Timing	14 DAB	14 DAB	14 DAB	28 DAB	28 DAB		
Days After First/Last Applic.	43, 14	43, 14	43, 14	57, 28	57, 28		
Trt-Eval Interval	14 DA-B	14 DA-B	14 DA-B	28 DA-B	28 DA-B		
Plant-Eval Interval	43 DP-1	43 DP-1	43 DP-1	57 DP-1	57 DP-1		
Days After Emergence	37 DE-1	37 DE-1	37 DE-1	51 DE-1	51 DE-1		
Number of Decimals	0	0	0	0	0		
Trt Treatment	Rate	Appl	6	7	8	9	10
No. Name	Rate Unit	Code					
1 DUAL II MAGNUM	0.75 pt/a	A	79 d	97 a	0 -	11 e	75 e
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
2 DUAL II MAGNUM	0.75 pt/a	A	85 c	93 a	0 -	90 d	91 cd
CALLISTO	2.25 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
3 DUAL II MAGNUM	0.75 pt/a	A	93 ab	84 b	0 -	91 cd	95 bc
TOUGH R (BCP1016H)	12 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
4 DUAL II MAGNUM	0.75 pt/a	A	89 abc	85 b	0 -	95 a-d	96 abc
CALLISTO	3 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
5 DUAL II MAGNUM	0.75 pt/a	A	95 a	76 c	0 -	93 cd	99 ab
TOUGH	8 fl oz/a	B					
CALLISTO	3 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
6 DUAL II MAGNUM	0.75 pt/a	A	93 ab	78 c	0 -	96 abc	100 a
TOUGH R (BCP1016H)	16 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
7 DUAL II MAGNUM	0.75 pt/a	A	94 a	83 b	0 -	94 bcd	99 ab
TOUGH R (BCP1016H)	16 fl oz/a	B					
AATREX	1 pt/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
8 DUAL II MAGNUM	0.75 pt/a	A	91 ab	96 a	0 -	90 d	91 cd
TOUGH	6 fl oz/a	B					
LAUDIS	3 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					

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Belchim Evaluation of TOUGH and HPPD Herbicides for Waterhemp Control in Corn

Trial ID: 22S-MGS-CORN-02 Cooperator Trial ID:
 Protocol ID: 22S-MGS-CORN-02 Location: MEIGS Trial Year: 2022
 Project ID: Project ID 2: Project ID 3:
 Study Director: Brent Mansfield Sponsor Contact: Dennis Long - Belchim
 Investigator (Creator): Dr. Bill Johnson

Pest Type	W, Weed	W, Weed	W, Weed	W, Weed	W, Weed		
Pest Code	ABUTH	SETFA		AMATA	AMBTR		
Pest Scientific Name	Abutilon theop>	Setaria faberi		Amaranthus x ta>	Ambrosia trifida		
Pest Name	velvetleaf	Giant foxtail		common water he>	Giant ragweed		
Crop Type, Code			C, ZEAMX				
BBCH Scale			BCOR				
Crop Scientific Name			Zea mays				
Crop Name			Corn				
Rating Date	Jun-23-2022	Jun-23-2022	Jun-23-2022	Jul-7-2022	Jul-7-2022		
Part Rated	PLOT, P	PLOT, P	PLOT, P	PLOT, P	PLOT, P		
Rating Type	CONTRO	CONTRO	PHYGEN	CONTRO	CONTRO		
Rating Unit/Min/Max	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100		
Number of Subsamples	0	0	1	0	0		
Data Entry Date	Jul-20-2022	Jul-20-2022	Jul-20-2022	Jul-20-2022	Jul-20-2022		
Rating Timing	14 DAB	14 DAB	14 DAB	28 DAB	28 DAB		
Days After First/Last Applic.	43, 14	43, 14	43, 14	57, 28	57, 28		
Trt-Eval Interval	14 DA-B	14 DA-B	14 DA-B	28 DA-B	28 DA-B		
Plant-Eval Interval	43 DP-1	43 DP-1	43 DP-1	57 DP-1	57 DP-1		
Days After Emergence	37 DE-1	37 DE-1	37 DE-1	51 DE-1	51 DE-1		
Number of Decimals	0	0	0	0	0		
Trt Treatment							
No. Name	6	7	8	9	10		
Rate							
Rate Unit							
Appl Code							
9 DUAL II MAGNUM	0.75 pt/a	A	95 a	96 a	0 -	99 ab	96 ab
TOUGH	8 fl oz/a	B					
LAUDIS	3 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
10 DUAL II MAGNUM	0.75 pt/a	A	90 abc	96 a	0 -	95 a-d	90 d
IMPACT	1 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
11 DUAL II MAGNUM	0.75 pt/a	A	88 bc	95 a	0 -	100 a	99 ab
TOUGH	8 fl oz/a	B					
IMPACT	1 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
12 NONTREATED			0	0	0	0	0
LSD P=.05	6.1	4.7	.	5.7	4.7		
Standard Deviation	4.3	3.2	0.0	4.0	3.3		
CV	4.73	3.65	0.0	4.58	3.48		
Levene's F^	1.674	2.233*	.	3.524*	2.044		
Levene's Prob(F)	0.129	0.041*	.	0.003*	0.06		
Shapiro-Wilk^	0.956	0.9785	.	0.9843	0.9474*		
P(Shapiro-Wilk)^	0.0919	0.5751	.	0.802	0.0439*		
Skewness^	-0.234	-0.3444	.	0.1837	-0.5182		
P(Skewness)^	0.5299	0.3566	.	0.6217	0.168		
Kurtosis^	0.2851	0.244	.	0.6405	1.6756*		
P(Kurtosis)^	0.6962	0.7382	.	0.3821	0.0257*		
Replicate F	1.562	0.628	0.000	0.684	0.765		
Replicate Prob(F)	0.2192	0.6027	1.0000	0.5690	0.5226		
Treatment F	5.224	23.939	0.000	161.458	19.010		
Treatment Prob(F)	0.0002	0.0001	1.0000	0.0001	0.0001		

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Belchim Evaluation of TOUGH and HPPD Herbicides for Waterhemp Control in Corn

Trial ID: 22S-MGS-CORN-02 Cooperator Trial ID:
 Protocol ID: 22S-MGS-CORN-02 Location: MEIGS Trial Year: 2022
 Project ID: Project ID 2: Project ID 3:
 Study Director: Brent Mansfield Sponsor Contact: Dennis Long - Belchim
 Investigator (Creator): Dr. Bill Johnson

Pest Type	W, Weed	W, Weed	W, Weed	W, Weed	W, Weed			
Pest Code	ABUTH	SETFA	AMATA	AMBTR	ABUTH			
Pest Scientific Name	Abutilon theoph>	Setaria faberi	Amaranthus x ta>	Ambrosia trifida	Abutilon theoph>			
Pest Name	velvetleaf	Giant foxtail	common water he>	Giant ragweed	velvetleaf			
Crop Type, Code								
BBCH Scale								
Crop Scientific Name								
Crop Name								
Rating Date	Jul-7-2022	Jul-7-2022	Jul-21-2022	Jul-21-2022	Jul-21-2022			
Part Rated	PLOT, P	PLOT, P	PLOT, P	PLOT, P	PLOT, P			
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO			
Rating Unit/Min/Max	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100			
Number of Subsamples	0	0	0	0	0			
Data Entry Date	Jul-20-2022	Jul-20-2022	Jul-22-2022	Jul-22-2022	Jul-22-2022			
Rating Timing	28 DAB	28 DAB						
Days After First/Last Applic.	57, 28	57, 28	71, 42	71, 42	71, 42			
Trt-Eval Interval	28 DA-B	28 DA-B	42 DA-B	42 DA-B	42 DA-B			
Plant-Eval Interval	57 DP-1	57 DP-1	71 DP-1	71 DP-1	71 DP-1			
Days After Emergence	51 DE-1	51 DE-1	65 DE-1	65 DE-1	65 DE-1			
Number of Decimals	0	0	0	0	0			
Trt Treatment								
No. Name	11	12	13	14	15			
Rate								
Appl Code								
1	DUAL II MAGNUM ROUNDUP POWERMAX 3 AMSOL	0.75 pt/a 20 fl oz/a 8.5 lb ai/100 gal	A B B	73 f	100 a	83 c	78 a	80 c
2	DUAL II MAGNUM CALLISTO ROUNDUP POWERMAX 3 AMSOL	0.75 pt/a 2.25 fl oz/a 20 fl oz/a 8.5 lb ai/100 gal	A B B B	89 d	97 a	91 abc	80 a	90 ab
3	DUAL II MAGNUM TOUGH R (BCP1016H) ROUNDUP POWERMAX 3 AMSOL	0.75 pt/a 12 fl oz/a 20 fl oz/a 8.5 lb ai/100 gal	A B B B	95 bc	88 bc	96 ab	46 c	92 a
4	DUAL II MAGNUM CALLISTO ROUNDUP POWERMAX 3 AMSOL	0.75 pt/a 3 fl oz/a 20 fl oz/a 8.5 lb ai/100 gal	A B B B	99 ab	90 b	97 a	84 a	98 a
5	DUAL II MAGNUM TOUGH CALLISTO ROUNDUP POWERMAX 3 AMSOL	0.75 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	100 a	83 d	99 a	81 a	96 a
6	DUAL II MAGNUM TOUGH R (BCP1016H) ROUNDUP POWERMAX 3 AMSOL	0.75 pt/a 16 fl oz/a 20 fl oz/a 8.5 lb ai/100 gal	A B B B	99 ab	88 bc	98 a	60 bc	95 a
7	DUAL II MAGNUM TOUGH R (BCP1016H) AATREX ROUNDUP POWERMAX 3 AMSOL	0.75 pt/a 16 fl oz/a 1 pt/a 20 fl oz/a 8.5 lb ai/100 gal	A B B B B	99 ab	84 cd	98 a	83 a	98 a
8	DUAL II MAGNUM TOUGH LAUDIS ROUNDUP POWERMAX 3 AMSOL	0.75 pt/a 6 fl oz/a 3 fl oz/a 20 fl oz/a 8.5 lb ai/100 gal	A B B B B	97 abc	100 a	97 a	71 ab	89 abc

Purdue University Weed Science

Belchim Evaluation of TOUGH and HPPD Herbicides for Waterhemp Control in Corn

Trial ID: 22S-MGS-CORN-02 Cooperator Trial ID:
 Protocol ID: 22S-MGS-CORN-02 Location: MEIGS Trial Year: 2022
 Project ID: Project ID 2: Project ID 3:
 Study Director: Brent Mansfield Sponsor Contact: Dennis Long - Belchim
 Investigator (Creator): Dr. Bill Johnson

Pest Type	W, Weed	W, Weed	W, Weed	W, Weed	W, Weed		
Pest Code	ABUTH	SETFA	AMATA	AMBTR	ABUTH		
Pest Scientific Name	Abutilon theoph>	Setaria faberi	Amaranthus x ta>	Ambrosia trifida	Abutilon theoph>		
Pest Name	velvetleaf	Giant foxtail	common water he>	Giant ragweed	velvetleaf		
Crop Type, Code							
BBCH Scale							
Crop Scientific Name							
Crop Name							
Rating Date	Jul-7-2022	Jul-7-2022	Jul-21-2022	Jul-21-2022	Jul-21-2022		
Part Rated	PLOT, P	PLOT, P	PLOT, P	PLOT, P	PLOT, P		
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO		
Rating Unit/Min/Max	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100		
Number of Subsamples	0	0	0	0	0		
Data Entry Date	Jul-20-2022	Jul-20-2022	Jul-22-2022	Jul-22-2022	Jul-22-2022		
Rating Timing	28 DAB	28 DAB					
Days After First/Last Applic.	57, 28	57, 28	71, 42	71, 42	71, 42		
Trt-Eval Interval	28 DA-B	28 DA-B	42 DA-B	42 DA-B	42 DA-B		
Plant-Eval Interval	57 DP-1	57 DP-1	71 DP-1	71 DP-1	71 DP-1		
Days After Emergence	51 DE-1	51 DE-1	65 DE-1	65 DE-1	65 DE-1		
Number of Decimals	0	0	0	0	0		
Trt Treatment							
No. Name	11	12	13	14	15		
Rate							
Rate Unit							
Appl Code							
9 DUAL II MAGNUM	0.75 pt/a	A	100 a	100 a	95 ab	84 a	80 c
TOUGH	8 fl oz/a	B					
LAUDIS	3 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
10 DUAL II MAGNUM	0.75 pt/a	A	94 c	100 a	86 bc	80 a	80 c
IMPACT	1 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
11 DUAL II MAGNUM	0.75 pt/a	A	83 e	100 a	96 ab	79 a	81 bc
TOUGH	8 fl oz/a	B					
IMPACT	1 fl oz/a	B					
ROUNDUP POWERMAX 3	20 fl oz/a	B					
AMSOL	8.5 lb ai/100 gal	B					
12 NONTREATED			0	0	0	0	0
LSD P=.05	4.4	4.5	10.1	13.9	8.8		
Standard Deviation	3.0	3.1	7.0	9.6	6.1		
CV	3.26	3.33	7.4	12.84	6.85		
Levene's F^	1.021	1.159	5.209*	0.60	2.092		
Levene's Prob(F)	0.448	0.352	0.00*	0.803	0.054		
Shapiro-Wilk^	0.9146*	0.9207*	0.9683	0.9867	0.9829		
P(Shapiro-Wilk)^	0.0032*	0.005*	0.2636	0.8864	0.7489		
Skewness^	0.9179*	-0.2623	-0.0004	-0.2961	0.1847		
P(Skewness)^	0.017*	0.4817	0.9991	0.4274	0.6198		
Kurtosis^	1.6166*	2.6332*	1.1495	0.0876	-0.4106		
P(Kurtosis)^	0.0311*	0.0007*	0.1203	0.9045	0.5743		
Replicate F	0.331	0.682	0.193	2.272	4.854		
Replicate Prob(F)	0.8029	0.5701	0.9005	0.1004	0.0072		
Treatment F	33.547	21.554	2.277	5.974	5.885		
Treatment Prob(F)	0.0001	0.0001	0.0399	0.0001	0.0001		

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Belchim Evaluation of TOUGH and HPPD Herbicides for Waterhemp Control in Corn

Trial ID: 22S-MGS-CORN-02 Cooperator Trial ID:
 Protocol ID: 22S-MGS-CORN-02 Location: MEIGS Trial Year: 2022
 Project ID: Project ID 2: Project ID 3:
 Study Director: Brent Mansfield Sponsor Contact: Dennis Long - Belchim
 Investigator (Creator): Dr. Bill Johnson

Pest Type				W, Weed
Pest Code				SETFA
Pest Scientific Name				Setaria faberi
Pest Name				Giant foxtail
Crop Type, Code				
BBCH Scale				
Crop Scientific Name				
Crop Name				
Rating Date				Jul-21-2022
Part Rated				PLOT, P
Rating Type				CONTRO
Rating Unit/Min/Max				%, 0, 100
Number of Subsamples				0
Data Entry Date				Jul-22-2022
Rating Timing				
Days After First/Last Applic.				71, 42
Trt-Eval Interval				42 DA-B
Plant-Eval Interval				71 DP-1
Days After Emergence				65 DE-1
Number of Decimals				0
Trt Treatment	Rate	Appl	16	
No. Name	Rate Unit	Code		
1 DUAL II MAGNUM	0.75 pt/a	A	91 ab	
ROUNDUP POWERMAX 3	20 fl oz/a	B		
AMSOL	8.5 lb ai/100 gal	B		
2 DUAL II MAGNUM	0.75 pt/a	A	75 bc	
CALLISTO	2.25 fl oz/a	B		
ROUNDUP POWERMAX 3	20 fl oz/a	B		
AMSOL	8.5 lb ai/100 gal	B		
3 DUAL II MAGNUM	0.75 pt/a	A	54 d	
TOUGH R (BCP1016H)	12 fl oz/a	B		
ROUNDUP POWERMAX 3	20 fl oz/a	B		
AMSOL	8.5 lb ai/100 gal	B		
4 DUAL II MAGNUM	0.75 pt/a	A	90 ab	
CALLISTO	3 fl oz/a	B		
ROUNDUP POWERMAX 3	20 fl oz/a	B		
AMSOL	8.5 lb ai/100 gal	B		
5 DUAL II MAGNUM	0.75 pt/a	A	80 abc	
TOUGH	8 fl oz/a	B		
CALLISTO	3 fl oz/a	B		
ROUNDUP POWERMAX 3	20 fl oz/a	B		
AMSOL	8.5 lb ai/100 gal	B		
6 DUAL II MAGNUM	0.75 pt/a	A	63 cd	
TOUGH R (BCP1016H)	16 fl oz/a	B		
ROUNDUP POWERMAX 3	20 fl oz/a	B		
AMSOL	8.5 lb ai/100 gal	B		
7 DUAL II MAGNUM	0.75 pt/a	A	90 ab	
TOUGH R (BCP1016H)	16 fl oz/a	B		
AATREX	1 pt/a	B		
ROUNDUP POWERMAX 3	20 fl oz/a	B		
AMSOL	8.5 lb ai/100 gal	B		
8 DUAL II MAGNUM	0.75 pt/a	A	94 a	
TOUGH	6 fl oz/a	B		
LAUDIS	3 fl oz/a	B		
ROUNDUP POWERMAX 3	20 fl oz/a	B		
AMSOL	8.5 lb ai/100 gal	B		

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Belchim Evaluation of TOUGH and HPPD Herbicides for Waterhemp Control in Corn

Trial ID: 22S-MGS-CORN-02 Cooperator Trial ID:
 Protocol ID: 22S-MGS-CORN-02 Location: MEIGS Trial Year: 2022
 Project ID: Project ID 2: Project ID 3:
 Study Director: Brent Mansfield Sponsor Contact: Dennis Long - Belchim
 Investigator (Creator): Dr. Bill Johnson

Pest Type				W, Weed
Pest Code				SETFA
Pest Scientific Name				Setaria faberi
Pest Name				Giant foxtail
Crop Type, Code				
BBCH Scale				
Crop Scientific Name				
Crop Name				
Rating Date				Jul-21-2022
Part Rated				PLOT, P
Rating Type				CONTRO
Rating Unit/Min/Max				%, 0, 100
Number of Subsamples				0
Data Entry Date				Jul-22-2022
Rating Timing				
Days After First/Last Applic.				71, 42
Trt-Eval Interval				42 DA-B
Plant-Eval Interval				71 DP-1
Days After Emergence				65 DE-1
Number of Decimals				0
Trt Treatment	Rate	Appl		16
No. Name	Rate Unit	Code		
9 DUAL II MAGNUM	0.75 pt/a	A		88 ab
TOUGH	8 fl oz/a	B		
LAUDIS	3 fl oz/a	B		
ROUNDUP POWERMAX 3	20 fl oz/a	B		
AMSOL	8.5 lb ai/100 gal	B		
10 DUAL II MAGNUM	0.75 pt/a	A		75 bc
IMPACT	1 fl oz/a	B		
ROUNDUP POWERMAX 3	20 fl oz/a	B		
AMSOL	8.5 lb ai/100 gal	B		
11 DUAL II MAGNUM	0.75 pt/a	A		95 a
TOUGH	8 fl oz/a	B		
IMPACT	1 fl oz/a	B		
ROUNDUP POWERMAX 3	20 fl oz/a	B		
AMSOL	8.5 lb ai/100 gal	B		
12 NONTREATED				0
LSD P=.05				18.7
Standard Deviation				12.9
CV				15.94
Levene's F^				0.85
Levene's Prob(F)				0.586
Shapiro-Wilk^				0.9714
P(Shapiro-Wilk)^				0.3395
Skewness^				-0.0481
P(Skewness)^				0.897
Kurtosis^				-0.8461
P(Kurtosis)^				0.2498
Replicate F				1.030
Replicate Prob(F)				0.3935
Treatment F				4.364
Treatment Prob(F)				0.0008

Purdue University Weed Science

Belchim Evaluation of TOUGH and HPPD Herbicides for Waterhemp Control in Corn

Trial ID: 22S-MGS-CORN-02 Cooperator Trial ID:
 Protocol ID: 22S-MGS-CORN-02 Location: MEIGS Trial Year: 2022
 Project ID: Project ID 2: Project ID 3:
 Study Director: Brent Mansfield Sponsor Contact: Dennis Long - Belchim
 Investigator (Creator): Dr. Bill Johnson

Pest Type
 W, Weed = Weed or volunteer crop
Pest Code
 AMATA, Amaranthus x tamariscinus, common water hemp = US
 AMBTR, Ambrosia trifida, Giant ragweed = US
 ABUTH, Abutilon theophrasti, velvetleaf = US
 SETFA, Setaria faberi, Giant foxtail = US
Crop Type Code
 C = EPPO species (Bayer) codes
 ZEAMX, BCOR, Zea mays, Corn = US
Part Rated
 PLOT = plot
 P = Pest is Part Rated
Rating Type
 CONTRO = control / burndown or knockdown
 PHYGEN = phytotoxicity - general / injury
Rating Unit/Min/Max
 %, 0, 100 = percent
Plant-Eval Interval
 37 DP-1 = 1 ZEAMX May-11-2022
 43 DP-1 = 1 ZEAMX May-11-2022
 57 DP-1 = 1 ZEAMX May-11-2022
 71 DP-1 = 1 ZEAMX May-11-2022

Trt No.	Treatment Type Name	Form Conc	Form Unit	Form Type	Rate Rate Unit	Appl Code	Rep 1	2	3	4	Notes
1	HERB DUAL II MAGNUM	7.64	LBA/GAL	EC	0.75 pt/a	A	101	205	504	601	
	HERB ROUNDUP POWERMAX 3	4.8	LBAE/GAL	SL	20 fl oz/a	B					
	ADJ AMSOL	3.4	LBA/GAL	L	8.5 lb ai/100 gal	B					
2	HERB DUAL II MAGNUM	7.64	LBA/GAL	EC	0.75 pt/a	A	102	304	408	505	
	HERB CALLISTO	4	LBA/GAL	SC	2.25 fl oz/a	B					
	HERB ROUNDUP POWERMAX 3	4.8	LBAE/GAL	SL	20 fl oz/a	B					
3	HERB DUAL II MAGNUM	7.64	LBA/GAL	EC	0.75 pt/a	A	103	305	403	506	
	HERB TOUGH R (BCP1016H)	3.25	LBA/GAL	L	12 fl oz/a	B					
	HERB ROUNDUP POWERMAX 3	4.8	LBAE/GAL	SL	20 fl oz/a	B					
4	HERB DUAL II MAGNUM	7.64	LBA/GAL	EC	0.75 pt/a	A	104	308	401	605	
	HERB CALLISTO	4	LBA/GAL	SC	3 fl oz/a	B					
	HERB ROUNDUP POWERMAX 3	4.8	LBAE/GAL	SL	20 fl oz/a	B					
5	HERB DUAL II MAGNUM	7.64	LBA/GAL	EC	0.75 pt/a	A	105	302	404	603	
	HERB TOUGH	5	LBA/GAL	EC	8 fl oz/a	B					
	HERB CALLISTO	4	LBA/GAL	SC	3 fl oz/a	B					
6	HERB DUAL II MAGNUM	7.64	LBA/GAL	EC	0.75 pt/a	A	106	307	405	507	
	HERB TOUGH R (BCP1016H)	3.25	LBA/GAL	L	16 fl oz/a	B					
	HERB ROUNDUP POWERMAX 3	4.8	LBAE/GAL	SL	20 fl oz/a	B					
7	HERB DUAL II MAGNUM	7.64	LBA/GAL	EC	0.75 pt/a	A	107	301	406	508	
	HERB TOUGH R (BCP1016H)	3.25	LBA/GAL	L	16 fl oz/a	B					
	HERB AATREX	4	LBA/GAL	SC	1 pt/a	B					
8	HERB DUAL II MAGNUM	7.64	LBA/GAL	EC	0.75 pt/a	A	108	303	501	604	
	HERB TOUGH	5	LBA/GAL	EC	6 fl oz/a	B					
	HERB LAUDIS	3.5	LBA/GAL	SC	3 fl oz/a	B					
9	HERB DUAL II MAGNUM	7.64	LBA/GAL	EC	0.75 pt/a	A	201	206	502	607	
	HERB TOUGH	5	LBA/GAL	EC	8 fl oz/a	B					
	HERB LAUDIS	3.5	LBA/GAL	SC	3 fl oz/a	B					
10	HERB DUAL II MAGNUM	7.64	LBA/GAL	EC	0.75 pt/a	A	202	207	503	602	
	HERB IMPACT	2.8	LBA/GAL	SC	1 fl oz/a	B					
	HERB ROUNDUP POWERMAX 3	4.8	LBAE/GAL	SL	20 fl oz/a	B					
	ADJ AMSOL	3.4	LBA/GAL	L	8.5 lb ai/100 gal	B					

Purdue University Weed Science

Belchim Evaluation of TOUGH and HPPD Herbicides for Waterhemp Control in Corn

Trial ID: 22S-MGS-CORN-02 Cooperator Trial ID:
 Protocol ID: 22S-MGS-CORN-02 Location: MEIGS Trial Year: 2022
 Project ID: Project ID 2: Project ID 3:
 Study Director: Brent Mansfield Sponsor Contact: Dennis Long - Belchim
 Investigator (Creator): Dr. Bill Johnson

Trt No.	Treatment Type Name	Form Conc	Form Unit	Form Type	Rate Rate	Rate Unit	Appl Code	Rep 1	2	3	4	Notes
11	HERB DUAL II MAGNUM	7.64	LBA/GAL	EC	0.75	pt/a	A	203	306	407	608	
	HERB TOUGH	5	LBA/GAL	EC	8	fl oz/a	B					
	HERB IMPACT	2.8	LBA/GAL	SC	1	fl oz/a	B					
	HERB ROUNDUP POWERMAX 3	4.8	LBAE/GAL	SL	20	fl oz/a	B					
	ADJ AMSOL	3.4	LBA/GAL	L	8.5	lb ai/100 gal	B					
12	CHK NONTREATED							204	208	402	606	

Sort Order: Replicate 1