

Purdue Weed Science

Evaluation of Improved Performance of Impact on Resistant and Larger Weeds with Adding Tough 5 EC

Trial ID: 21S-MGS-CORN-03 Location: MEIGS Trial Year: 2021
 Protocol ID: 21S-MGS-CORN-03 Investigator (Creator): Dr. Bill Johnson
 Project ID: Study Director: Brent Mansfield
 Sponsor Contact: Dennis Long - Belchim

General Trial Information

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

Discipline: H herbicide
Trial Status: E established **Trial Reliability:** 1 usable data

ARM Trial Created On: 5/24/2021
Initiation Date: 5/23/2021

Trial Location

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

Conducted Under GLP: No
Conducted Under GEP: No

Contacts

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

Investigator: Dr. Bill Johnson **Title:** Professor
Organization: Purdue University
Address 1: 915 W. State Street
Country: USA United States **E-mail:** wjg@purdue.edu
City: West Lafayette **State/Prov:** IN **Postal Code:** 47907

Sponsor: Dennis Long - Belchim

Crop Description

Crop 1: C ZEAMX Zea mays corn **Stage Scale:** BBCH

Variety: DKC 62-52 RIB
Attributes: GLU-R, GLY-R

Planting Date: 5/23/2021 **Planting Rate:** 32000 S/A
Depth: 1.75 IN

Rows per Plot: 4 **Planting Method:** PLANTD planted
Row Spacing: 30 IN **Planting Equipment:** PP plot planter
Soil Temperature: 65 F **Soil Moisture:** NORMAL normal, adequate
Emergence Date: 5/31/2021

Pest Description

Pest 1 Type: W **Code:** AMATA *Amaranthus x tamariscinus*
Common Name: common water hemp **Stage Scale:** BBCH
Attributes: glyphosate-R

Pest 2 Type: W **Code:** ABUTH *Abutilon theophrasti*
Common Name: velvetleaf **Stage Scale:** BBCH

Pest 3 Type: W **Code:** SETFA *Setaria faberi*
Common Name: Giant foxtail **Stage Scale:** BBCH

Pest 4 Type: W **Code:** SIDSP *Sida spinosa*
Common Name: Prickly sida **Stage Scale:** BBCH

Pest 5 Type: W **Code:** AMBTR *Ambrosia trifida*
Common Name: Giant ragweed **Stage Scale:** BBCH

Site and Design

Treated Plot Width: 6.67 FT **Site Type:** FIELD field
Treated Plot Length: 25 FT **Experimental Unit:** 1 PLOT plot
Treated Plot Area: 166.75 FT2 **Treatments:** 8 **Tillage Type:** NOTILL no-till
Replications: 4 **Study Design:** RACOB� Randomized Complete Block (RCB)

Maintenance

No.	Date	Type	Maintenance Product Name	Form Type	Rate	Rate Unit
1.	5/24/2021	FERT	UREA	D	390	LB/A

Soil Description**Description Name:** MEIGS-S3**% Sand:** 21 **% OM:** 2.2 **Texture:** SIL silt loam**% Silt:** 54 **pH:** 6.8 **Soil Name:** Starks-Fincastle complex**% Clay:** 25 **CEC:** 8.3**Weather Conditions****Closest Weather Station:** Meigs **Distance:** 100 FT

No.	Date	Moisture Total	Unit	Min Temp	Max Temp	Temp Unit
1.	5/1/2021	0	IN	40	63	F
2.	5/2/2021	0	IN	49	74	F
3.	5/3/2021	0.26	IN	56	78	F
4.	5/4/2021	0.01	IN	55	66	F
5.	5/5/2021	0.04	IN	43	59	F
6.	5/6/2021	0	IN	42	61	F
7.	5/7/2021	0.25	IN	38	58	F
8.	5/8/2021	0	IN	32	63	F
9.	5/9/2021	1.43	IN	40	57	F
10.	5/10/2021	0.37	IN	37	47	F
11.	5/11/2021	0.09	IN	39	59	F
12.	5/12/2021	0	IN	36	61	F
13.	5/13/2021	0	IN	38	60	F
14.	5/14/2021	0	IN	41	66	F
15.	5/15/2021	0	IN	46	70	F
16.	5/16/2021	0	IN	53	71	F
17.	5/17/2021	0.35	IN	55	71	F
18.	5/18/2021	0.12	IN	58	63	F
19.	5/19/2021	0	IN	59	72	F
20.	5/20/2021	0	IN	64	75	F
21.	5/21/2021	0	IN	64	84	F
22.	5/22/2021	0	IN	63	83	F
23.	5/23/2021	0	IN	63	85	F
24.	5/24/2021	0	IN	68	85	F
25.	5/25/2021	0	IN	67	88	F
26.	5/26/2021	0.32	IN	66	87	F
27.	5/27/2021	0.19	IN	58	81	F
28.	5/28/2021	0.08	IN	60	80	F
29.	5/29/2021	0.47	IN	43	61	F
30.	5/30/2021	0	IN	41	63	F
31.	5/31/2021	0	IN	43	71	F
32.	6/1/2021	0	IN	57	71	F
33.	6/2/2021	0.04	IN	58	74	F
34.	6/3/2021	0.03	IN	59	87	F
35.	6/4/2021	0	IN	61	82	F
36.	6/5/2021	0	IN	63	88	F
37.	6/6/2021	0	IN	66	86	F
38.	6/7/2021	0.01	IN	69	83	F
39.	6/8/2021	0.1	IN	69	83	F
40.	6/9/2021	0	IN	70	85	F
41.	6/10/2021	0	IN	67	85	F
42.	6/11/2021	0	IN	69	85	F
43.	6/12/2021	0	IN	67	90	F
44.	6/13/2021	0	IN	69	93	F
45.	6/14/2021	0	IN	63	86	F
46.	6/15/2021	0	IN	57	83	F
47.	6/16/2021	0	IN	53	81	F
48.	6/17/2021	0	IN	53	82	F
49.	6/18/2021	0.01	IN	61	86	F
50.	6/19/2021	0.47	IN	67	93	F

51.	6/20/2021	0	IN	67	81	F
52.	6/21/2021	0.1	IN	70	86	F
53.	6/22/2021	0	IN	49	72	F
54.	6/23/2021	0	IN	54	74	F
55.	6/24/2021	0	IN	60	77	F
56.	6/25/2021	1.19	IN	63	79	F
57.	6/26/2021	0.83	IN	70	81	F
58.	6/27/2021	1.05	IN	69	85	F
59.	6/28/2021	0.11	IN	69	86	F
60.	6/29/2021	0	IN	72	88	F
61.	6/30/2021	0	IN	72	89	F
62.	7/1/2021	0.35	IN	70	78	F
63.	7/2/2021	0	IN	55	82	F
64.	7/3/2021	0	IN	53	75	F
65.	7/4/2021	0	IN	57	78	F
66.	7/5/2021	0	IN	67	85	F
67.	7/6/2021	0	IN	68	86	F
68.	7/7/2021	0	IN	71	86	F
69.	7/8/2021	1.29	IN	67	86	F
70.	7/9/2021	0.05	IN	59	80	F
71.	7/10/2021	0.03	IN	61	73	F
72.	7/11/2021	0.1	IN	65	76	F
73.	7/12/2021	1.3	IN	66	76	F
74.	7/13/2021	0.4	IN	67	82	F
75.	7/14/2021	0.08	IN	65	79	F
76.	7/15/2021	0	IN	66	82	F
77.	7/16/2021	0.16	IN	69	86	F
78.	7/17/2021	0.1	IN	66	78	F
79.	7/18/2021	0.01	IN	66	80	F
80.	7/19/2021	0	IN	61	83	F
81.	7/20/2021	0	IN	61	82	F
82.	7/21/2021	0	IN	64	83	F
83.	7/22/2021	0	IN	64	79	F
84.	7/23/2021	0	IN	67	83	F
85.	7/24/2021	0	IN	71	86	F
86.	7/25/2021	0	IN	69	87	F
87.	7/26/2021	0	IN	65	88	F
88.	7/27/2021	0	IN	62	87	F
89.	7/28/2021	0	IN	66	86	F
90.	7/29/2021	0	IN	70	87	F
91.	7/30/2021	0	IN	65	88	F
92.	7/31/2021	0	IN	62	78	F

Application Description

	A	B
Application Date	5/24/2021	6/29/2021
Appl. Start Time	1:39 PM	12:25 PM
Appl. Stop Time	1:52 PM	12:35 PM
Application Method	SPRAY	SPRAY
Application Timing	PREPRE	5-6" WEEDS
Application Placement	BROSOI	BROFOL
Applied By	J. HAARMANN	B. MANSFIELD
Air Temperature Start, Stop	88, 88 F	87, 87 F
% Relative Humidity Start, Stop	36, 36	66, 66
Wind Velocity+Dir. Start	1.5 MPH, SW	5 MPH, SW
Wet Leaves (Y/N)	N, no	N, no
Soil Temperature	85 F	82 F
Soil Moisture	NORMAL	NORMAL
% Cloud Cover	30	50

Crop Stage At Each Application

	A	B
Crop 1 Code, BBCH Scale	ZEAMX, BCOR	ZEAMX, BCOR
Days after Emergence	-7	29
Stage Majority, Percent	00, -	16, -
Stage Minimum, Percent	00, -	15, -
Stage Maximum, Percent	00, -	17, -
Height Average	0 IN	24 IN
Height Minimum, Maximum	0, 0	18, 26

Pest Stage At Each Application

	A	B
Pest 1 Code, Type, Scale	AMATA, W, BBCH	AMATA, W, BBCH
Stage Majority, Percent	00, -	18, -
Stage Minimum, Percent	00, -	15, -
Stage Maximum, Percent	00, -	19, -
Height Average	0 IN	6 IN
Height Minimum, Maximum	0, 0	3, 10
Density Average	0 FT2	6 FT2
Density Minimum, Maximum		2, 16
Pest 2 Code, Type, Scale	ABUTH, W, BBCH	ABUTH, W, BBCH
Stage Majority, Percent	00, -	14, -
Stage Minimum, Percent	00, -	12, -
Stage Maximum, Percent	00, -	17, -
Height Average	0 IN	6 IN
Height Minimum, Maximum	0, 0	1, 11
Density Average	0 FT2	2 FT2
Density Minimum, Maximum		1, 5
Pest 3 Code, Type, Scale	SETFA, W, BBCH	SETFA, W, BBCH
Stage Majority, Percent	00, -	15, -
Stage Minimum, Percent	00, -	13, -
Stage Maximum, Percent	00, -	16, -
Height Average	0 IN	10 IN
Height Minimum, Maximum	0, 0	6, 18
Density Average	0 FT2	8 FT2
Density Minimum, Maximum		1, 20
Pest 4 Code, Type, Scale	SIDSP, W, BBCH	SIDSP, W, BBCH
Stage Majority, Percent	00, -	18, -
Stage Minimum, Percent	00, -	15, -
Stage Maximum, Percent	00, -	19, -
Height Average	0 IN	5 IN
Height Minimum, Maximum	0, 0	2, 8
Density Average	0 FT2	4 FT2
Density Minimum, Maximum		1, 15
Pest 5 Code, Type, Scale	AMBTR, W, BBCH	AMBTR, W, BBCH
Stage Majority, Percent	00, -	19, -
Stage Minimum, Percent	00, -	18, -
Stage Maximum, Percent	00, -	19, -
Height Average	0 IN	17 IN
Height Minimum, Maximum	0, 0	10, 24
Density Average	0 FT2	2 FT2
Density Minimum, Maximum		2, 5

Application Equipment		
	A	B
Appl. Equipment	CO2 BACKPACK	CO2 BACKPACK
Equipment Type	BACSPR	BACSPR
Operation Pressure	25 PSI	38 PSI
Nozzle Model	XR	TT
Nozzle Type	FLAFXR	TEEJTU
Nozzle TradeName	TEEJET	TEEJET
Nozzle Tip Size, Color	8002, YELLOW	110015, GREEN
Nozzle Spacing	20 IN	20 IN
Nozzles/Row	4	4
Boom Length	6.67 FT	6.67 FT
Boom Height	17 IN	32 IN
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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Trial ID: 21S-MGS-CORN-03	Location: MEIGS	Investigator (Creator): Dr. Bill Johnson	Trial Year: 2021
Protocol ID: 21S-MGS-CORN-03	Project ID:	Study Director: Brent Mansfield	Sponsor Contact: Dennis Long - Belchim

Pest Type			W, Weed AMATA	W, Weed ABUTH	W, Weed SETFA	W, Weed SIDSP	W, Weed AMBTR			
Pest Code			common water he>	velvetleaf	Giant foxtail	Prickly sida	Giant ragweed			
Pest Name										
Crop Type, Code	C, ZEAMX	C, ZEAMX								
Crop Name	Corn	Corn								
Rating Date	7/6/2021	7/13/2021	7/6/2021	7/6/2021	7/6/2021	7/6/2021	7/6/2021			
Rating Type	PHYGEN	PHYGEN	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO			
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100			
Number of Subsamples	1	1	1	1	1	1	1			
Data Entry Date	11/29/2021	11/29/2021	11/29/2021	11/29/2021	11/29/2021	11/29/2021	11/29/2021			
Rating Timing	7 DAB	14 DAB	7 DAB	7 DAB	7 DAB	7 DAB	7 DAB			
Days After First/Last Applic.	43, 7	50, 14	43, 7	43, 7	43, 7	43, 7	43, 7			
Days After Emergence	36 DE-1	43 DE-1	36 DE-1	36 DE-1	36 DE-1	36 DE-1	36 DE-1			
Trt No.	Treatment Name	Rate	Appl Code	1	2	3	4	5	6	7
		Rate Unit								
1	NONTREATED	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	DUAL II MAGNUM	0.75 PT/A	A	0.0 b	0.0 -	50.0 b	50.0 b	85.0 b	72.5 b	7.5 c
3	DUAL II MAGNUM	0.75 PT/A	A	0.0 b	0.0 -	88.8 a	95.0 a	85.0 b	100.0 a	82.5 b
	IMPACT	0.75 FL OZ/A	B							
	MSO ULTRA	1 % V/V	B							
	AMSOL	2.5 % V/V	B							
4	DUAL II MAGNUM	0.75 PT/A	A	0.3 b	0.0 -	95.0 a	95.0 a	91.3 a	100.0 a	90.0 a
	IMPACT	0.75 FL OZ/A	B							
	TOUGH	8 FL OZ/A	B							
	ACTIVATOR 90	0.25 % V/V	B							
	AMSOL	2.5 % V/V	B							
5	DUAL II MAGNUM	0.75 PT/A	A	3.0 a	0.0 -	98.5 a	96.5 a	92.0 a	100.0 a	92.5 a
	IMPACT	0.75 FL OZ/A	B							
	TOUGH	8 FL OZ/A	B							
	AATREX	1 PT/A	B							
	ACTIVATOR 90	0.25 % V/V	B							
	AMSOL	2.5 % V/V	B							
6	DUAL II MAGNUM	0.75 PT/A	A	0.0 b	0.0 -	95.5 a	95.0 a	83.8 b	100.0 a	81.3 b
	IMPACT	1 FL OZ/A	B							
	MSO ULTRA	1 % V/V	B							
	AMSOL	2.5 % V/V	B							
7	DUAL II MAGNUM	0.75 PT/A	A	0.3 b	0.0 -	100.0 a	97.0 a	92.5 a	100.0 a	95.0 a
	IMPACT	1 FL OZ/A	B							
	TOUGH	8 FL OZ/A	B							
	ACTIVATOR 90	0.25 % V/V	B							
	AMSOL	2.5 % V/V	B							
8	DUAL II MAGNUM	0.75 PT/A	A	3.5 a	0.0 -	100.0 a	97.0 a	93.8 a	100.0 a	95.0 a
	IMPACT	1 FL OZ/A	B							
	TOUGH	8 FL OZ/A	B							
	AATREX	1 PT/A	B							
	ACTIVATOR 90	0.25 % V/V	B							
	AMSOL	2.5 % V/V	B							
LSD P=.05	0.69	.	.	11.52	11.15	4.39	8.42	6.19		
Standard Deviation	0.47	0.00	.	7.75	7.51	2.95	5.67	4.17		
CV	46.72	0.0	.	8.64	8.4	3.32	5.9	5.36		
Grand Mean	1.00	0.00	.	89.68	89.36	89.04	96.07	77.68		
Levene's F^	0.538	.	.	0.608	0.597	2.495	0.595	6.711		
Levene's Prob(F)	0.774	.	.	0.721	0.73	0.056	0.731	0.00*		
Rank X2	.	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.	.
Skewness^	1.7709*	.	.	-2.4109*	-2.48*	-0.3006	-2.4926*	0.6396		
Kurtosis^	5.2073*	.	.	10.4723*	11.0921*	-0.6207	11.1577*	3.5419*		
Replicate F	0.873	0.000	.	0.828	1.118	1.622	1.000	0.600		
Replicate Prob(F)	0.4735	1.0000	.	0.4956	0.3678	0.2195	0.4155	0.6233		
Treatment F	43.909	0.000	.	21.396	21.448	8.295	13.444	227.811		
Treatment Prob(F)	0.0001	1.0000	.	0.0001	0.0001	0.0002	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.
 Untreated treatment(s) 1 excluded from analysis.
 Could not calculate LSD (% mean diff) for columns 2 because error mean square = 0.
 ^Calculated from residual.

Pest Type	W, Weed	W, Weed	W, Weed	W, Weed	W, Weed	W, Weed	W, Weed
Pest Code	AMATA	ABUTH	SETFA	SIDSP	AMBTR	AMATA	ABUTH
Pest Name	common water he>	velvetleaf	Giant foxtail	Prickly sida	Giant ragweed	common water he>	velvetleaf
Crop Type, Code							
Crop Name							
Rating Date	7/13/2021	7/13/2021	7/13/2021	7/13/2021	7/13/2021	7/27/2021	7/27/2021
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit/Min/Max	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100
Number of Subsamples	1	1	1	1	1	1	1
Data Entry Date	11/29/2021	11/29/2021	11/29/2021	11/29/2021	11/29/2021	11/29/2021	11/29/2021
Rating Timing	14 DAB	14 DAB	14 DAB	14 DAB	14 DAB	28 DAB	28 DAB
Days After First/Last Applic.	50, 14	50, 14	50, 14	50, 14	50, 14	64, 28	64, 28
Days After Emergence	43 DE-1	43 DE-1	43 DE-1	43 DE-1	43 DE-1	57 DE-1	57 DE-1
Trt Treatment	8	9	10	11	12	13	14
No. Name							
Rate							
Rate Unit							
Appl Code							
1 NONTREATED	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 DUAL II MAGNUM 0.75 PT/A A	38.8 b	40.0 b	73.8 d	70.0 b	1.3 d	25.0 b	25.0 b
3 DUAL II MAGNUM 0.75 PT/A A IMPACT 0.75 FL OZ/A B MSO ULTRA 1 % V/V B AMSOL 2.5 % V/V B	93.8 a	100.0 a	91.3 b	100.0 a	93.3 b	95.0 a	100.0 a
4 DUAL II MAGNUM 0.75 PT/A A IMPACT 0.75 FL OZ/A B TOUGH 8 FL OZ/A B ACTIVATOR 90 0.25 % V/V B AMSOL 2.5 % V/V B	96.0 a	100.0 a	95.5 ab	100.0 a	95.5 ab	96.5 a	100.0 a
5 DUAL II MAGNUM 0.75 PT/A A IMPACT 0.75 FL OZ/A B TOUGH 8 FL OZ/A B AATREX 1 PT/A B ACTIVATOR 90 0.25 % V/V B AMSOL 2.5 % V/V B	100.0 a	100.0 a	92.8 ab	100.0 a	95.0 ab	100.0 a	100.0 a
6 DUAL II MAGNUM 0.75 PT/A A IMPACT 1 FL OZ/A B MSO ULTRA 1 % V/V B AMSOL 2.5 % V/V B	96.0 a	100.0 a	86.3 c	100.0 a	90.0 c	96.5 a	100.0 a
7 DUAL II MAGNUM 0.75 PT/A A IMPACT 1 FL OZ/A B TOUGH 8 FL OZ/A B ACTIVATOR 90 0.25 % V/V B AMSOL 2.5 % V/V B	100.0 a	100.0 a	94.3 ab	100.0 a	95.0 ab	100.0 a	100.0 a
8 DUAL II MAGNUM 0.75 PT/A A IMPACT 1 FL OZ/A B TOUGH 8 FL OZ/A B AATREX 1 PT/A B ACTIVATOR 90 0.25 % V/V B AMSOL 2.5 % V/V B	100.0 a	100.0 a	96.5 a	100.0 a	96.0 a	100.0 a	100.0 a
LSD P=.05	10.93	11.23	4.84	7.60	2.63	9.77	9.73
Standard Deviation	7.35	7.56	3.26	5.12	1.77	6.57	6.55
CV	8.24	8.27	3.62	5.35	2.19	7.51	7.33
Grand Mean	89.21	91.43	90.04	95.71	80.86	87.57	89.29
Levene's F^	0.895	0.595	0.835	0.945	0.763	1.225	1.19
Levene's Prob(F)	0.517	0.731	0.556	0.484	0.607	0.333	0.349
Rank X2	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.
Skewness^	-2.3224*	-2.4926*	-0.6554	-2.2593*	0.0278	-1.8319*	-1.9188*
Kurtosis^	10.2287*	11.1577*	2.7434*	10.7291*	0.8926	9.7752*	10.2356*
Replicate F	1.059	1.000	0.335	1.000	0.457	1.049	1.000
Replicate Prob(F)	0.3910	0.4155	0.8000	0.4155	0.7154	0.3951	0.4155
Treatment F	37.077	36.000	23.727	19.636	1583.562	70.846	75.000
Treatment Prob(F)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
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Could not calculate LSD (% mean diff) for columns 2 because error mean square = 0.
^Calculated from residual.

Pest Type	W, Weed	W, Weed	W, Weed	W, Weed	W, Weed	W, Weed	W, Weed
Pest Code	SETFA	SIDSP	AMBTR	AMATA	ABUTH	SETFA	SIDSP
Pest Name	Giant foxtail	Prickly sida	Giant ragweed	common water he	velvetleaf	Giant foxtail	Prickly sida
Crop Type, Code							
Crop Name							
Rating Date	7/27/2021	7/27/2021	7/27/2021	8/10/2021	8/10/2021	8/10/2021	8/10/2021
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Number of Subsamples	1	1	1	1	1	1	1
Data Entry Date	11/29/2021	11/29/2021	11/29/2021	11/29/2021	11/29/2021	11/29/2021	11/29/2021
Rating Timing	28 DAB	28 DAB	28 DAB	42 DAB	42 DAB	42 DAB	42 DAB
Days After First/Last Applic.	64, 28	64, 28	64, 28	78, 42	78, 42	78, 42	78, 42
Days After Emergence	57 DE-1	57 DE-1	57 DE-1	71 DE-1	71 DE-1	71 DE-1	71 DE-1
Trt Treatment							
No. Name							
Rate							
Rate Unit							
Appl Code							
	15	16	17	18	19	20	21
1 NONTREATED	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 DUAL II MAGNUM 0.75 PT/A A	66.3 c	56.3 b	0.0 d	10.0 b	15.0 b	46.3 c	22.5 b
3 DUAL II MAGNUM 0.75 PT/A A IMPACT 0.75 FL OZ/A B MSO ULTRA 1 % V/V B AMSOL 2.5 % V/V B	95.5 ab	100.0 a	98.5 ab	96.0 a	100.0 a	96.0 ab	100.0 a
4 DUAL II MAGNUM 0.75 PT/A A IMPACT 0.75 FL OZ/A B TOUGH 8 FL OZ/A B ACTIVATOR 90 0.25 % V/V B AMSOL 2.5 % V/V B	96.5 ab	100.0 a	99.5 a	96.5 a	100.0 a	95.5 ab	100.0 a
5 DUAL II MAGNUM 0.75 PT/A A IMPACT 0.75 FL OZ/A B TOUGH 8 FL OZ/A B AATREX 1 PT/A B ACTIVATOR 90 0.25 % V/V B AMSOL 2.5 % V/V B	94.0 ab	100.0 a	97.0 bc	100.0 a	100.0 a	94.0 b	100.0 a
6 DUAL II MAGNUM 0.75 PT/A A IMPACT 1 FL OZ/A B MSO ULTRA 1 % V/V B AMSOL 2.5 % V/V B	92.0 b	100.0 a	95.5 c	97.3 a	100.0 a	93.3 b	100.0 a
7 DUAL II MAGNUM 0.75 PT/A A IMPACT 1 FL OZ/A B TOUGH 8 FL OZ/A B ACTIVATOR 90 0.25 % V/V B AMSOL 2.5 % V/V B	95.5 ab	100.0 a	98.3 ab	100.0 a	100.0 a	95.5 ab	100.0 a
8 DUAL II MAGNUM 0.75 PT/A A IMPACT 1 FL OZ/A B TOUGH 8 FL OZ/A B AATREX 1 PT/A B ACTIVATOR 90 0.25 % V/V B AMSOL 2.5 % V/V B	98.0 a	100.0 a	97.8 ab	100.0 a	100.0 a	98.0 a	100.0 a
LSD P=.05	4.61	6.23	2.17	5.06	5.61	3.70	5.38
Standard Deviation	3.10	4.19	1.46	3.40	3.78	2.49	3.62
CV	3.4	4.47	1.74	3.97	4.3	2.82	4.07
Grand Mean	91.11	93.75	83.79	85.68	87.86	88.36	88.93
Levene's F^	2.056	1.038	3.604	2.49	0.595	3.573	5.357
Levene's Prob(F)	0.103	0.429	0.013*	0.056	0.731	0.013*	0.002*
Rank X2	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.
Skewness^	-0.6383	-2.1435*	-0.5365	0.0962	-2.4926*	-0.202	-1.065*
Kurtosis^	0.9699	10.5474*	1.2435	6.4107*	11.1577*	0.7145	6.7684*
Replicate F	0.440	1.000	0.648	0.784	1.000	0.835	1.000
Replicate Prob(F)	0.7275	0.4155	0.5943	0.5182	0.4155	0.4922	0.4155
Treatment F	51.463	62.288	2565.224	385.617	289.000	223.239	262.091
Treatment Prob(F)	0.0001	0.0001	0.0001	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.
Untreated treatment(s) 1 excluded from analysis.
Could not calculate LSD (% mean diff) for columns 2 because error mean square = 0.
^Calculated from residual.

Pest Type	W, Weed		
Pest Code	AMBTR		
Pest Name	Giant ragweed		
Crop Type, Code			
Crop Name			
Rating Date	8/10/2021		
Rating Type	CONTRO		
Rating Unit/Min/Max	%, 0, 100		
Number of Subsamples	1		
Data Entry Date	11/29/2021		
Rating Timing	42 DAB		
Days After First/Last Applic.	78, 42		
Days After Emergence	71 DE-1		
Trt No.	Treatment Name	Rate	Appl Code
		Rate Unit	
1	NONTREATED		
			22
			0.0
2	DUAL II MAGNUM	0.75 PT/A	A
			0.0 c
3	DUAL II MAGNUM	0.75 PT/A	A
	IMPACT	0.75 FL OZ/A	B
	MISO ULTRA	1 % V/V	B
	AMSOL	2.5 % V/V	B
			98.0 ab
4	DUAL II MAGNUM	0.75 PT/A	A
	IMPACT	0.75 FL OZ/A	B
	TOUGH	8 FL OZ/A	B
	ACTIVATOR 90	0.25 % V/V	B
	AMSOL	2.5 % V/V	B
			100.0 a
5	DUAL II MAGNUM	0.75 PT/A	A
	IMPACT	0.75 FL OZ/A	B
	TOUGH	8 FL OZ/A	B
	AATREX	1 PT/A	B
	ACTIVATOR 90	0.25 % V/V	B
	AMSOL	2.5 % V/V	B
			97.0 b
6	DUAL II MAGNUM	0.75 PT/A	A
	IMPACT	1 FL OZ/A	B
	MISO ULTRA	1 % V/V	B
	AMSOL	2.5 % V/V	B
			96.0 b
7	DUAL II MAGNUM	0.75 PT/A	A
	IMPACT	1 FL OZ/A	B
	TOUGH	8 FL OZ/A	B
	ACTIVATOR 90	0.25 % V/V	B
	AMSOL	2.5 % V/V	B
			98.5 ab
8	DUAL II MAGNUM	0.75 PT/A	A
	IMPACT	1 FL OZ/A	B
	TOUGH	8 FL OZ/A	B
	AATREX	1 PT/A	B
	ACTIVATOR 90	0.25 % V/V	B
	AMSOL	2.5 % V/V	B
			97.5 ab
LSD P=.05	2.73		
Standard Deviation	1.84		
CV	2.19		
Grand Mean	83.86		
Levene's F^	9.985		
Levene's Prob(F)	0.00*		
Rank X2	.		
P(Rank X2)	.		
Skewness^	-0.1205		
Kurtosis^	-0.2481		
Replicate F	0.310		
Replicate Prob(F)	0.8180		
Treatment F	1619.535		
Treatment Prob(F)	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.
Untreated treatment(s) 1 excluded from analysis.
Could not calculate LSD (% mean diff) for columns 2 because error mean square = 0.
^Calculated from residual.

Purdue Weed Science

Evaluation of Improved Performance of Impact on Resistant and Larger Weeds with Adding Tough 5 EC

Trial ID: 21S-MGS-CORN-03 Location: MEIGS Trial Year: 2021
Protocol ID: 21S-MGS-CORN-03 Investigator (Creator): Dr. Bill Johnson
Project ID: Study Director: Brent Mansfield
Sponsor Contact: Dennis Long - Belchim

Pest Type

W, Weed = Weed or volunteer crop

Pest Code

AMATA, Amaranthus x tamariscinus, common water hemp = US

ABUTH, Abutilon theophrasti, velvetleaf = US

SETFA, Setaria faberi, Giant foxtail = US

SIDSP, Sida spinosa, Prickly sida = US

AMBTR, Ambrosia trifida, Giant ragweed = US

Crop Type, Code

C = EPP0 species (Bayer) codes

ZEAMX, BCOR, Zea mays, Corn = US

Rating Type

PHYGEN = phytotoxicity - general / injury

CONTRO = control / burndown or knockdown

Rating Unit/Min/Max

%, 0, 100 = percent