

Purdue Weed Science

Evaluation of Tough 5EC in Common Tank Mixtures for Waterhemp Control

Trial ID: 18S-MGS-Corn-12 (2) Location: Meigs Trial Year: 2018
 Protocol ID: 18S-MGS-Corn-12 Investigator: Dr. Bill Johnson
 Project ID: Study Director: Taylor Campbell
 Sponsor Contact: Belchim - Dave Wright

General Trial Information

Study Director: Taylor Campbell
Investigator: Dr. Bill Johnson

Discipline: H herbicide
Trial Status: E established

Trial Location

City: Lafayette **Country:** USA United States
State/Prov.: Indiana
Postal Code: 47909

Conducted Under GLP: No
Conducted Under GEP: No

Contacts

Study Director: Taylor Campbell
Organization: Purdue University
Address: 915 W State Street
City+State/Prov: West Lafayette, IN
Postal Code: 47907
Country: USA United States

Investigator: Dr. Bill Johnson
Organization: Purdue University
Address: 915 W State Street
City+State/Prov: West Lafayette, IN
Postal Code: 47907
Country: USA United States

Cooperator/Landowner

Cooperator: Jay Young **Role:** Superintendent
Organization: Purdue University
Address 1: 8343 US 231 S
City: Lafayette **Phone No.:** 765-538-3422
State/Prov: IN **Fax No.:** 765-538-3423
Postal Code: 47909
Country: USA United States **E-mail:** jayyoung@purdue.edu

Crop Description

Crop 1: ZEAMX Zea mays Corn
Variety: DKC62-52RIB
Description: LL/RR Stacked

Planting Rate, Unit: 32000 S/A
Depth, Unit: 2 IN
Row Spacing, Unit: 30 IN

Rows per Plot: 4
Soil Temperature, Unit: 69 F

Soil Moisture: SLIDRY slightly dry

Planting Date: 5/7/2018
Planting Method: PLANTD planted
Planting Equipment: PP plot planter
Emergence Date: 5/12/2018

Harvested Width, Unit: 5 FT
Harvested Length, Unit: 25 FT
% Standard Moisture: 15.0

Pest Description

Pest 1 Type: W **Code:** AMATA **Amaranthus tamariscinus**
Common Name: Common waterhemp

Pest 2 Type: W **Code:** PANDI **Panicum dichotomiflorum**
Common Name: Fall panicum

Site and Design

Treated Plot Width: 6.67 FT

Treated Plot Length: 30 FT

Treated Plot Area: 200.1 FT² **Treatments:** 13

Replications: 4

Site Type: FIELD field
Experimental Unit: 1 PLOT plot

Tillage Type: NOTILL no-till

Study Design: RACOB� Randomized Complete Block (RCB)

Soil Description

Description Name: MGS-S5

% Sand: 40.7 **% OM:** 2.3 **Texture:** L loam
% Silt: 38.6 **pH:** 6.5 **Soil Name:** Starks-Fincastle complex
% Clay: 20.7 **CEC:** 14.3 **Fert. Level:** G good

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Application Description

	A	B
Application Date:	5/7/2018	5/29/2018
Appl. Start Time:	5:05 PM	1:06 AM
Appl. Stop Time:	5:20 PM	1:28 AM
Application Method:	SPRAY	SPRAY
Application Timing:	PREMCR	POSPOS
Application Placement:	BROADC	BROADC
Applied By:	T. Campbell	T. Campbell
Air Temperature, Unit:	74 F	91 F
% Relative Humidity:	45	42
Wind Velocity, Unit:	3 MPH	5 mph
Wind Direction:	E	W
Dew Presence (Y/N):	N no	N no
Soil Temperature, Unit:	71 F	90 F
Soil Moisture:	SLIDRY	DRY
% Cloud Cover:	30	80

Crop Stage At Each Application

	A	B
Crop 1 Code, BBCH Scale:	ZEAMX BCOR	ZEAMX BCOR
Stage Scale Used:	BBCH	BBCH
Stage Majority, Percent:	00	14 90
Stage Minimum, Percent:		14 90
Stage Maximum, Percent:		15 10
Average Diameter, Unit:		6 IN
Height, Unit:		10 IN
Height Minimum, Maximum:		10 12

Pest Stage At Each Application

	A	B
Pest 1 Code, Type, Scale:	AMATA W	AMATA W
Stage Majority, Percent:	00	14 70
Stage Minimum, Percent:		10 5
Stage Maximum, Percent:		17 25
Diameter, Unit:		2 IN
Height, Unit:		3 IN
Height Minimum, Maximum:		2 4
Density, Unit:		3 FT2
Pest 2 Code, Type, Scale:	PANDI W	PANDI W
Stage Majority, Percent:	00	14 85
Stage Minimum, Percent:		11 10
Stage Maximum, Percent:		16 5
Diameter, Unit:		1 IN
Height, Unit:		2 IN
Height Minimum, Maximum:		1 3
Density, Unit:		6 FT2

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Application Equipment

	A	B
Appl. Equipment:	ATV Sprayer	CO2 BACKPACK
Equipment Type:	SPRAYE	BACCAI
Operation Pressure, Unit:	30 PSI	44 PSI
Nozzle Type:	AIXR	AIXR
Nozzle Size:	11002	11015
Nozzle Spacing, Unit:	20 IN	20 IN
Nozzles/Row:	12	4
Boom Length, Unit:	20 FT	6.7 FT
Boom Height, Unit:	30 IN	28 IN
Ground Speed, Unit:	5 MPH	3 MPH
Carrier:	WATER	WATER
Spray Volume, Unit:	10 GAL/AC	15 GAL/AC
Mix Size, Unit:	20 GAL	1119 mL
Propellant:	PUMDIA	COMCO2

Date By Notes

4/18/2018	T. Campbell	180 lbs/a of N applied or 409 lbs of actual ESN applied
4/24/2018	T. Campbell	Burndown 32 oz of Roundup Power Max, 1 pt of 2,4-D Shredder (ester formulation), and 2.5% v/v N-Pak AMS @ 10 gpa, 30 psi, 5 mph, and 1102 AIXR nozzle on a 4 wheeler with a 20 ft boom with 20 inch spacings
5/7/2018	T. Campbell	Gramoxone sprayed morning of planting at 2 pt/a plus 1% v/v of COC @ 10 gpa, 30 psi, 5 mph, and 1102 AIXR nozzle on a 4 wheeler with a 20 ft boom with 20 inch spacings
5/7/2018	T. Campbell	Application A was made with ATV sprayer. 20 gallon tank size.
6/7/2018	T. Campbell	Evening storm brought hail and slight damage occurred at Meigs field site.

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Reps: 4 Appl Code: A Plots: 6.67 by 30 feet
 Spray vol: 10 GAL/AC Mix Size: 20 GAL (total for 4 plots; minimum=.18375 GAL)

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Appl Unit	Appl Code	Amt Product to Measure	Rep 1	Rep 2	Rep 3	Rep 4
2	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	102	209	409	604
3	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	103	302	405	605
4	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	104	205	408	505
5	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	105	306	401	603
6	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	106	207	403	601
7	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	107	208	402	602
8	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	108	206	406	504
9	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	109	305	502	509
10	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	201	304	503	507
11	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	202	308	501	506
12	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	203	307	404	508
13	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	204	303	309	607

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Reps: 4 Appl Code: B Plots: 6.67 by 30 feet
 Spray vol: 15 GAL/AC Mix Size: 1119 mL (total for 4 plots; minimum=1043.3 mL)

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Appl Unit	Code	Amt to Measure	Rep 1	Rep 2	Rep 3	Rep 4
2	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	B		18.65 mL/mx	102	209	409	604
	AATREX	4 LB/GAL	L		2.4 pt/a	B		22.38 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	B		27.97 mL/mx				
3	TOUGH 5EC	5 LB/GAL	L		8 fl oz/a	B		4.662 mL/mx	103	302	405	605
	AATREX	4 LB/GAL	L		2.4 pt/a	B		22.38 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	B		27.97 mL/mx				
4	TOUGH 5EC	5 LB/GAL	L		10 fl oz/a	B		5.828 mL/mx	104	205	408	505
	AATREX	4 LB/GAL	L		2.4 pt/a	B		22.38 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	B		27.97 mL/mx				
5	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	B		18.65 mL/mx	105	306	401	603
	TOUGH 5EC	5 LB/GAL	L		8 fl oz/a	B		4.662 mL/mx				
	AATREX	4 LB/GAL	L		2.4 pt/a	B		22.38 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	B		27.97 mL/mx				
6	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	B		18.65 mL/mx	106	207	403	601
	TOUGH 5EC	5 LB/GAL	L		10 fl oz/a	B		5.828 mL/mx				
	AATREX	4 LB/GAL	L		2.4 pt/a	B		22.38 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	B		27.97 mL/mx				
7	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	B		18.65 mL/mx	107	208	402	602
	CALLISTO	4 LB/GAL	L		3 fl oz/a	B		1.748 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	B		27.97 mL/mx				
8	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	B		18.65 mL/mx	108	206	406	504
	TOUGH 5EC	5 LB/GAL	L		8 fl oz/a	B		4.662 mL/mx				
	CALLISTO	4 LB/GAL	L		3 fl oz/a	B		1.748 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	B		27.97 mL/mx				
9	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	B		18.65 mL/mx	109	305	502	509
	TOUGH 5EC	5 LB/GAL	L		10 fl oz/a	B		5.828 mL/mx				
	CALLISTO	4 LB/GAL	L		3 fl oz/a	B		1.748 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	B		27.97 mL/mx				
10	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	B		18.65 mL/mx	201	304	503	507
	CALLISTO	4 LB/GAL	L		3 fl oz/a	B		1.748 mL/mx				
	AATREX	4 LB/GAL	L		2.4 pt/a	B		22.38 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	B		27.97 mL/mx				
11	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	B		18.65 mL/mx	202	308	501	506
	TOUGH 5EC	5 LB/GAL	L		8 fl oz/a	B		4.662 mL/mx				
	CALLISTO	4 LB/GAL	L		3 fl oz/a	B		1.748 mL/mx				
	AATREX	4 LB/GAL	L		2.4 pt/a	B		22.38 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	B		27.97 mL/mx				
12	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	B		18.65 mL/mx	203	307	404	508
	BCP1016 H (PREMIX)	3.25 LBA/GAL	L		16 fl oz/a	B		9.325 mL/mx				
	AATREX	4 LB/GAL	L		2.4 pt/a	B		22.38 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	B		27.97 mL/mx				
13	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	B		18.65 mL/mx	204	303	309	607
	TOUGH 5EC	5 LB/GAL	L		10 fl oz/a	B		5.828 mL/mx				
	CALLISTO	4 LB/GAL	L		3 fl oz/a	B		1.748 mL/mx				
	AATREX	4 LB/GAL	L		2.4 pt/a	B		22.38 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	B		27.97 mL/mx				

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Project ID:	Study Director: Taylor Campbell	
	Sponsor Contact: Belchim - Dave Wright	

Reps: 4 Appl Code: _ Plots: 6.67 by 30 feet
 Spray vol: 15 GAL/AC Mix Size: 1119 mL (total for 4 plots; minimum=1043.3 mL)

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Appl Unit	Code	Amt Product to Measure	Rep			
									1	2	3	4
1	UNTREATED								101	301	407	606

Sort Order: Application Code, Replicate 1

Product quantities required for listed treatments and applications of trials included in this table:

Amount*	Unit	Treatment Name	Form Conc	Form Unit	Form Type	Lot Code
18,879.726	mL	DUAL II MAGNUM	7.64	LB/GAL	L	
233.125	mL	ROUNDUP POWERMAX	4.5	LBAE/GAL	SL	
251.775	mL	AATREX	4	LB/GAL	L	
419.579	mL	N-PAK	3.4	LBA/GAL	L	
52.453	mL	TOUGH 5EC	5	LB/GAL	L	
13.113	mL	CALLISTO	4	LB/GAL	L	
11.656	mL	BCP1016 H (PREMIX)	3.25	LBA/GAL	L	

* 'Per area' calculations based on spray volume= 10,15 GAL/AC, mix size= 20 GAL, 1119 mL (mix size basis).

* Product amount calculations increased 25 % for overage adjustment.

* 'Per volume' calculations use spray volume= 10,15 GAL/AC, mix size= 20 GAL, 1119 mL.

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Pest Type		W Weed	W Weed		W Weed	W Weed
Pest Code		PANDI	AMATA		PANDI	AMATA
Pest Name		Fall panicum	Common waterhe>		Fall panicum	Common waterhe>
Crop Code	ZEAMX				ZEAMX	
Crop Name	Corn				Corn	
Part Rated	PLOT C	PLOT P	PLOT P	PLOT C	PLOT P	PLOT P
Rating Date	6/4/2018	6/4/2018	6/4/2018	6/12/2018	6/12/2018	6/12/2018
Rating Type	PHYGEN	EMERGE	EMERGE	PHYGEN	EMERGE	EMERGE
Rating Unit	%	%	%	%	%	%
Number of Subsamples Assessed By	1 T. Campbell					
Days After First/Last Applic.	28 6	28 6	28 6	36 14	36 14	36 14
Days After Emergence	23 DE-1	23 DE-1	23 DE-1	31 DE-1	31 DE-1	31 DE-1
ARM Action Codes						
Number of Decimals	0	0	0	0	0	0
Trt Treatment	Rate	Appl				
No. Name	Rate Unit	Code	1	2	3	4
1 UNTREATED			0	0	0	0
2 DUAL II MAGNUM	1.33 pt/a	A	0 -	99 a	86 -	0 -
ROUNDUP POWERMAX	32 fl oz/a	B				100 a
AATREX	2.4 pt/a	B				
N-PAK	2.5 % v/v	B				
3 DUAL II MAGNUM	1.33 pt/a	A	0 -	65 b	100 -	0 -
TOUGH 5EC	8 fl oz/a	B				34 b
AATREX	2.4 pt/a	B				
N-PAK	2.5 % v/v	B				
4 DUAL II MAGNUM	1.33 pt/a	A	0 -	56 c	99 -	0 -
TOUGH 5EC	10 fl oz/a	B				30 b
AATREX	2.4 pt/a	B				
N-PAK	2.5 % v/v	B				
5 DUAL II MAGNUM	1.33 pt/a	A	0 -	99 a	97 -	0 -
ROUNDUP POWERMAX	32 fl oz/a	B				100 a
TOUGH 5EC	8 fl oz/a	B				
AATREX	2.4 pt/a	B				
N-PAK	2.5 % v/v	B				
6 DUAL II MAGNUM	1.33 pt/a	A	0 -	98 a	94 -	0 -
ROUNDUP POWERMAX	32 fl oz/a	B				100 a
TOUGH 5EC	10 fl oz/a	B				
AATREX	2.4 pt/a	B				
N-PAK	2.5 % v/v	B				
7 DUAL II MAGNUM	1.33 pt/a	A	1 -	100 a	99 -	0 -
ROUNDUP POWERMAX	32 fl oz/a	B				100 a
CALLISTO	3 fl oz/a	B				
N-PAK	2.5 % v/v	B				
8 DUAL II MAGNUM	1.33 pt/a	A	0 -	99 a	100 -	0 -
ROUNDUP POWERMAX	32 fl oz/a	B				100 a
TOUGH 5EC	8 fl oz/a	B				
CALLISTO	3 fl oz/a	B				
N-PAK	2.5 % v/v	B				
9 DUAL II MAGNUM	1.33 pt/a	A	0 -	100 a	100 -	0 -
ROUNDUP POWERMAX	32 fl oz/a	B				100 a
TOUGH 5EC	10 fl oz/a	B				
CALLISTO	3 fl oz/a	B				
N-PAK	2.5 % v/v	B				
10 DUAL II MAGNUM	1.33 pt/a	A	0 -	99 a	100 -	0 -
ROUNDUP POWERMAX	32 fl oz/a	B				100 a
CALLISTO	3 fl oz/a	B				
AATREX	2.4 pt/a	B				
N-PAK	2.5 % v/v	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.
 Untreated treatment(s) 1 excluded from analysis.
 Missing data estimates are included in columns: Yates=1,2,3,4,5,6,7,8,9,10,11
 Could not calculate LSD (% mean diff) for columns 4 because error mean square = 0.

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Pest Type Pest Code Pest Name	ZEAMX Corn PLOT C 6/4/2018 PHYGEN	W Weed	W Weed	W Weed	W Weed				
		PANDI Fall panicum	AMATA Common waterhe>	PANDI Fall panicum	AMATA Common waterhe>				
Crop Code	ZEAMX			ZEAMX					
Crop Name	Corn			Corn					
Part Rated	PLOT C	PLOT P	PLOT P	PLOT C	PLOT P				
Rating Date	6/4/2018	6/4/2018	6/4/2018	6/12/2018	6/12/2018				
Rating Type	PHYGEN	EMERGE	EMERGE	PHYGEN	EMERGE				
Rating Unit	%	%	%	%	%				
Number of Subsamples Assessed By	1 T. Campbell	1 T. Campbell	1 T. Campbell	1 T. Campbell	1 T. Campbell				
Days After First/Last Applic.	28 6	28 6	28 6	36 14	36 14				
Days After Emergence	23 DE-1	23 DE-1	23 DE-1	31 DE-1	31 DE-1				
ARM Action Codes									
Number of Decimals	0	0	0	0	0				
Trt No.	Treatment Name	Rate	Appl Code	1	2	3	4	5	6
11	DUAL II MAGNUM ROUNDUP POWERMAX TOUGH 5EC CALLISTO AATREX N-PAK	1.33 pt/a 32 fl oz/a 8 fl oz/a 3 fl oz/a 2.4 pt/a 2.5 % v/v	A B B B B B	0 -	100 a	100 -	0 -	100 a	100 -
12	DUAL II MAGNUM ROUNDUP POWERMAX BCP1016 H (PREMIX) AATREX N-PAK	1.33 pt/a 32 fl oz/a 16 fl oz/a 2.4 pt/a 2.5 % v/v	A B B B B	0 -	99 a	100 -	0 -	100 a	100 -
13	DUAL II MAGNUM ROUNDUP POWERMAX TOUGH 5EC CALLISTO AATREX N-PAK	1.33 pt/a 32 fl oz/a 10 fl oz/a 3 fl oz/a 2.4 pt/a 2.5 % v/v	A B B B B B	0 -	100 a	100 -	0 -	100 a	100 -
LSD P=.05		0.4	7.8	8.8	.	5.7	1.0		
Standard Deviation		0.3	5.4	6.1	0.0	4.0	0.7		
CV		642.26	5.8	6.27	0.0	4.49	0.7		
Levene's F			3.502	1.273	0.00	6.196	1.428		
Levene's Prob(F)			0.002*	0.28	0.00*	0.001*	0.204		
Skewness		6.8557*	-2.1919*	-4.7422*	.	-1.8904*	-6.4958*		
Kurtosis		47.0*	3.601*	23.3306*	.	1.785*	43.2309*		
Replicate F		1.164	1.685	2.776	0.000	1.394	1.390		
Replicate Prob(F)		0.3388	0.1899	0.0572	1.0000	0.2625	0.2636		
Treatment F		0.970	31.610	1.893	0.000	177.540	1.896		
Treatment Prob(F)		0.4921	0.0001	0.0786	1.0000	0.0001	0.0780		

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 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
 Untreated treatment(s) 1 excluded from analysis.
 Missing data estimates are included in columns: Yates=1,2,3,4,5,6,7,8,9,10,11
 Could not calculate LSD (% mean diff) for columns 4 because error mean square = 0.

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Pest Type	W Weed	W Weed			
Pest Code	PANDI	AMATA			
Pest Name	Fall panicum	Common waterhe>			
Crop Code			ZEAMX	ZEAMX	ZEAMX
Crop Name			Corn	Corn	Corn
Part Rated			PLOT C	PLOT C	PLOT C
Rating Date	PLOT P	PLOT P	10/17/2018	10/17/2018	10/17/2018
Rating Type	6/26/2018	6/26/2018	YIELD	MOICON	YIELD
Rating Unit	EMERGE	EMERGE	lb/plot	%	BU
Number of Subsamples Assessed By	%	%	1	1	1
	1	1	T. Campbell	T. Campbell	T. Campbell
Days After First/Last Applic.	50	50	163	163	163
Days After Emergence	28	28	141	141	141
ARM Action Codes	45 DE-1	45 DE-1	158 DE-1	158 DE-1	158 DE-1
Number of Decimals					TY2
	0	0	1	1	1
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	7	8	9
1 UNTREATED			0	0	20.8
2 DUAL II MAGNUM	1.33 pt/a	A	100 a	98 -	28.9 -
ROUNDUP POWERMAX	32 fl oz/a	B			17.5 -
AATREX	2.4 pt/a	B			172.0 -
N-PAK	2.5 % v/v	B			
3 DUAL II MAGNUM	1.33 pt/a	A	34 b	100 -	24.3 -
TOUGH 5EC	8 fl oz/a	B			18.2 -
AATREX	2.4 pt/a	B			145.4 -
N-PAK	2.5 % v/v	B			
4 DUAL II MAGNUM	1.33 pt/a	A	30 b	100 -	26.8 -
TOUGH 5EC	10 fl oz/a	B			17.7 -
AATREX	2.4 pt/a	B			161.2 -
N-PAK	2.5 % v/v	B			
5 DUAL II MAGNUM	1.33 pt/a	A	100 a	100 -	26.4 -
ROUNDUP POWERMAX	32 fl oz/a	B			17.9 -
TOUGH 5EC	8 fl oz/a	B			158.8 -
AATREX	2.4 pt/a	B			
N-PAK	2.5 % v/v	B			
6 DUAL II MAGNUM	1.33 pt/a	A	100 a	100 -	29.1 -
ROUNDUP POWERMAX	32 fl oz/a	B			18.0 -
TOUGH 5EC	10 fl oz/a	B			174.9 -
AATREX	2.4 pt/a	B			
N-PAK	2.5 % v/v	B			
7 DUAL II MAGNUM	1.33 pt/a	A	100 a	100 -	28.4 -
ROUNDUP POWERMAX	32 fl oz/a	B			17.8 -
CALLISTO	3 fl oz/a	B			170.9 -
N-PAK	2.5 % v/v	B			
8 DUAL II MAGNUM	1.33 pt/a	A	100 a	100 -	29.9 -
ROUNDUP POWERMAX	32 fl oz/a	B			17.9 -
TOUGH 5EC	8 fl oz/a	B			180.0 -
CALLISTO	3 fl oz/a	B			
N-PAK	2.5 % v/v	B			
9 DUAL II MAGNUM	1.33 pt/a	A	100 a	100 -	25.9 -
ROUNDUP POWERMAX	32 fl oz/a	B			17.5 -
TOUGH 5EC	10 fl oz/a	B			156.3 -
CALLISTO	3 fl oz/a	B			
N-PAK	2.5 % v/v	B			
10 DUAL II MAGNUM	1.33 pt/a	A	100 a	100 -	29.7 -
ROUNDUP POWERMAX	32 fl oz/a	B			17.7 -
CALLISTO	3 fl oz/a	B			179.1 -
AATREX	2.4 pt/a	B			
N-PAK	2.5 % v/v	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.
 Untreated treatment(s) 1 excluded from analysis.
 Missing data estimates are included in columns: Yates=1,2,3,4,5,6,7,8,9,10,11
 Could not calculate LSD (% mean diff) for columns 4 because error mean square = 0.

Purdue Weed Science

Evaluation of Tough 5EC in Common Tank Mixtures for Waterhemp Control

Trial ID: 18S-MGS-Corn-12 (2) Location: Meigs Trial Year: 2018
 Protocol ID: 18S-MGS-Corn-12 Investigator: Dr. Bill Johnson
 Project ID: Study Director: Taylor Campbell
 Sponsor Contact: Belchim - Dave Wright

Pest Type	W Weed	W Weed			
Pest Code	PANDI	AMATA			
Pest Name	Fall panicum	Common waterhe>			
Crop Code			ZEAMX	ZEAMX	ZEAMX
Crop Name			Corn	Corn	Corn
Part Rated			PLOT C	PLOT C	PLOT C
Rating Date	6/26/2018	6/26/2018	10/17/2018	10/17/2018	10/17/2018
Rating Type	EMERGE	EMERGE	YIELD	MOICON	YIELD
Rating Unit	%	%	lb/plot	%	BU
Number of Subsamples	1	1	1	1	1
Assessed By	T. Campbell	T. Campbell	T. Campbell	T. Campbell	T. Campbell
Days After First/Last Applic.	50 28	50 28	163 141	163 141	163 141
Days After Emergence	45 DE-1	45 DE-1	158 DE-1	158 DE-1	158 DE-1
ARM Action Codes					TY2
Number of Decimals	0	0	1	1	1
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	7	8	9
11 DUAL II MAGNUM	1.33 pt/a	A	100 a	100 -	27.1 -
ROUNDUP POWERMAX	32 fl oz/a	B			17.7 -
TOUGH 5EC	8 fl oz/a	B			163.1 -
CALLISTO	3 fl oz/a	B			
AATREX	2.4 pt/a	B			
N-PAK	2.5 % v/v	B			
12 DUAL II MAGNUM	1.33 pt/a	A	100 a	100 -	29.1 -
ROUNDUP POWERMAX	32 fl oz/a	B			17.9 -
BCP1016 H (PREMIX)	16 fl oz/a	B			175.2 -
AATREX	2.4 pt/a	B			
N-PAK	2.5 % v/v	B			
13 DUAL II MAGNUM	1.33 pt/a	A	99 a	100 -	30.5 -
ROUNDUP POWERMAX	32 fl oz/a	B			18.2 -
TOUGH 5EC	10 fl oz/a	B			182.6 -
CALLISTO	3 fl oz/a	B			
AATREX	2.4 pt/a	B			
N-PAK	2.5 % v/v	B			
LSD P=.05			5.7	1.0	5.27
Standard Deviation			4.0	0.7	3.65
CV			4.5	0.7	13.03
Levene's F			5.54	1.428	0.401
Levene's Prob(F)			0.001*	0.204	0.946
Skewness			-1.8877*	-6.4958*	-0.1498
Kurtosis			1.7797*	43.2309*	-0.2687
Replicate F			1.749	1.390	1.429
Replicate Prob(F)			0.1769	0.2636	0.2531
Treatment F			176.699	1.896	1.082
Treatment Prob(F)			0.0001	0.0780	0.4060
					1.522
					0.2284
					1.544
					0.1660
					1.519
					0.2291
					1.060
					0.4222

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Purdue Weed Science

Evaluation of Tough 5EC in Common Tank Mixtures for Waterhemp Control

Trial ID: 18S-MGS-Corn-12 (2)	Location: Meigs	Trial Year: 2018
Protocol ID: 18S-MGS-Corn-12	Investigator: Dr. Bill Johnson	
Project ID:	Study Director: Taylor Campbell	
	Sponsor Contact: Belchim - Dave Wright	

Pest Type

W, Weed, G-BYRW7, G-WedStg = Weed or volunteer crop

Pest Code

PANDI, Panicum dichotomiflorum, Fall panicum = US

AMATA, Amaranthus tamariscinus, Common waterhemp = US

Crop Code

ZEAMX, BCOR, Zea mays, Corn = US

Part Rated

PLOT = plot

C = Crop is Part Rated

P = Pest is Part Rated

Rating Type

PHYGEN = phytotoxicity - general / injury

EMERGE = emergence

YIELD = yield

MOICON = moisture content

Rating Unit

% = percent

lb/plot = pounds per plot

BU = bushel

ARM Action Codes

TY2 = 6.222857*[9]*(100-@MVAVGREP([10])/85