

Purdue Weed Science

Assessment of Pyridate + Mesotrione in Roundup System including late post emergence timing on Glyphosate Resistant Waterhemp

Trial ID: 18S-MGS-Corn-13 (2) Location: Meigs Trial Year: 2018
 Protocol ID: 18S-MGS-Corn-13 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:** 15

Replications: 4

Site Type: FIELD field
Experimental Unit: 1 PLOT plot

Tillage Type: NOTILL no-till

Study Design: RACOB L 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	C
Application Date:	5/7/2018	5/29/2018	6/4/2018
Appl. Start Time:	5:35 PM	1:30 PM	9:30 AM
Appl. Stop Time:	5:56 PM	1:52 PM	9:55 AM
Application Method:	SPRAY	SPRAY	SPRAY
Application Timing:	PREMCR	POSPOS	POSPOS
Application Placement:	BROADC	BROADC	BROADC
Applied By:	T. Campbell	T. Campbell	T. Campbell
Air Temperature, Unit:	74 F	91 F	68 F
% Relative Humidity:	45	42	60
Wind Velocity, Unit:	3 MPH	5 mph	5 MPH
Wind Direction:	E	W	SW
Dew Presence (Y/N):	N no	N no	N no
Soil Temperature, Unit:	71 F	90 F	65 F
Soil Moisture:	SLIDRY	DRY	SLIWET
% Cloud Cover:	30	80	30

Crop Stage At Each Application

	A	B	C
Crop 1 Code, BBCH Scale:	ZEAMX BCOR	ZEAMX BCOR	ZEAMX BCOR
Stage Scale Used:	BBCH	BBCH	BBCH
Stage Majority, Percent:	00	14 90	16 80
Stage Minimum, Percent:		14 90	15 20
Stage Maximum, Percent:		15 10	16 80
Average Diameter, Unit:		6 IN	7 IN
Height, Unit:		10 IN	22 IN
Height Minimum, Maximum:		10 12	20 26

Pest Stage At Each Application

	A	B	C
Pest 1 Code, Type, Scale:	AMATA W	AMATA W	AMATA W
Stage Majority, Percent:	00	14 70	18 80
Stage Minimum, Percent:		10 5	15 10
Stage Maximum, Percent:		17 25	21 10
Diameter, Unit:		2 IN	4 IN
Height, Unit:		3 IN	3 IN
Height Minimum, Maximum:		2 4	2 4
Density, Unit:		3 FT2	2 FT2
Pest 2 Code, Type, Scale:	PANDI W	PANDI W	PANDI W
Stage Majority, Percent:	00	14 85	17 80
Stage Minimum, Percent:		11 10	16 10
Stage Maximum, Percent:		16 5	18 10
Diameter, Unit:		1 IN	3 IN
Height, Unit:		2 IN	5 IN
Height Minimum, Maximum:		1 3	4 8
Density, Unit:		6 FT2	10 FT2

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

Application Equipment

	A	B	C
Appl. Equipment:	ATV Sprayer	CO2 BACKPACK	CO2 BACKPACK
Equipment Type:	SPRAYE	BACCAI	BACCAI
Operation Pressure, Unit:	30 PSI	44 PSI	43 PSI
Nozzle Type:	AIXR	AIXR	AIXR
Nozzle Size:	11002	11015	11015
Nozzle Spacing, Unit:	20 IN	20 IN	20 IN
Nozzles/Row:	12	4	4
Boom Length, Unit:	20 FT	6.7 FT	6.7 FT
Boom Height, Unit:	30 IN	28 IN	35 IN
Ground Speed, Unit:	5 MPH	3 MPH	3 MPH
Carrier:	WATER	WATER	
Spray Volume, Unit:	10 GAL/AC	15 GAL/AC	15 GAL/AC
Mix Size, Unit:	20 GAL	1119 mL	1119 mL
Propellant:	PUMDIA	COMCO2	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.

6/12/2018 T. Campbell Heavy amounts of residue from last years trial caused corn in plots 304, 305, 306, 307, 308, 404, 405, 406, 407, and 408 to be deficient in Nitrogen and to be stunted in growth.

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 Sponsor Contact: Belchim - Dave Wright

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	Rate 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	208	409	604
3	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	103	301	404	609
4	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	104	209	504	601
5	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	105	302	408	602
6	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	106	401	507	606
7	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	107	309	503	607
8	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	108	307	501	706
9	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	109	306	509	703
10	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	201	305	505	702
11	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	202	308	508	605
12	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	203	207	506	705
13	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	204	402	406	701
14	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	205	403	407	608
15	DUAL II MAGNUM	7.64	LB/GAL	L	1.33	pt/a	A	1258.6 mL/mx	206	304	405	704

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

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	Appl Code	Amt to Measure	Product	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	208	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	ROUNDUP POWERMAX	4.5	LBAE/GAL	SL	32 fl oz/a	B	18.65 mL/mx		103	301	404	609
	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	401	507	606
	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					
7	ROUNDUP POWERMAX	4.5	LBAE/GAL	SL	32 fl oz/a	B	18.65 mL/mx		107	309	503	607
	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					
10	ROUNDUP POWERMAX	4.5	LBAE/GAL	SL	32 fl oz/a	B	18.65 mL/mx		201	305	505	702
	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	508	605
	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					
14	ROUNDUP POWERMAX	4.5	LBAE/GAL	SL	32 fl oz/a	B	18.65 mL/mx		205	403	407	608
	BCP1016 H (PREMIX)	3.25	LBA/GAL	L	16 fl oz/a	B	9.325 mL/mx					
	N-PAK	3.4	LBA/GAL	L	2.5 % v/v	B	27.97 mL/mx					

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 Sponsor Contact: Belchim - Dave Wright

Reps: 4 Appl Code: C 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 to Measure	Rep 1	Rep 2	Rep 3	Rep 4
4	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	C		18.65 mL/mx	104	209	504	601
	AATREX	4 LB/GAL	L		2.4 pt/a	C		22.38 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	C		27.97 mL/mx				
5	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	C		18.65 mL/mx	105	302	408	602
	TOUGH 5EC	5 LB/GAL	L		8 fl oz/a	C		4.662 mL/mx				
	AATREX	4 LB/GAL	L		2.4 pt/a	C		22.38 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	C		27.97 mL/mx				
8	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	C		18.65 mL/mx	108	307	501	706
	CALLISTO	4 LB/GAL	L		3 fl oz/a	C		1.748 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	C		27.97 mL/mx				
9	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	C		18.65 mL/mx	109	306	509	703
	TOUGH 5EC	5 LB/GAL	L		8 fl oz/a	C		4.662 mL/mx				
	CALLISTO	4 LB/GAL	L		3 fl oz/a	C		1.748 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	C		27.97 mL/mx				
12	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	C		18.65 mL/mx	203	207	506	705
	CALLISTO	4 LB/GAL	L		3 fl oz/a	C		1.748 mL/mx				
	AATREX	4 LB/GAL	L		2.4 pt/a	C		22.38 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	C		27.97 mL/mx				
13	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	C		18.65 mL/mx	204	402	406	701
	TOUGH 5EC	5 LB/GAL	L		8 fl oz/a	C		4.662 mL/mx				
	CALLISTO	4 LB/GAL	L		3 fl oz/a	C		1.748 mL/mx				
	AATREX	4 LB/GAL	L		2.4 pt/a	C		22.38 mL/mx				
15	ROUNDUP POWERMAX	4.5 LBAE/GAL	SL		32 fl oz/a	C		18.65 mL/mx	206	304	405	704
	BCP1016 H (PREMIX)	3.25 LBA/GAL	L		16 fl oz/a	C		9.325 mL/mx				
	N-PAK	3.4 LBA/GAL	L		2.5 % v/v	C		27.97 mL/mx				

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Trial ID: 18S-MGS-Corn-13 (2)	Location: Meigs	Trial Year: 2018	
Protocol ID: 18S-MGS-Corn-13	Investigator: Dr. Bill Johnson		
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	303	502	603	

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
22,026.348	mL	DUAL II MAGNUM	7.64	LB/GAL	L	
326.375	mL	ROUNDUP POWERMAX	4.5	LBAE/GAL	SL	
223.800	mL	AATREX	4	LB/GAL	L	
489.509	mL	N-PAK	3.4	LBA/GAL	L	
34.969	mL	TOUGH 5EC	5	LB/GAL	L	
17.484	mL	CALLISTO	4	LB/GAL	L	
23.312	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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Protocol ID: 18S-MGS-Corn-13		Investigator: Dr. Bill Johnson				
Project ID:		Study Director: Taylor Campbell				
Sponsor Contact: Belchim - Dave Wright						

Pest Type Pest Code Pest Name	ZEAMX Corn	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	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	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 8	36 8	36 8		
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 No. Name	Rate Rate Unit	Appl Code	1	2	3	4	5	6
1 UNTREATED			0	0	0	0	0	0
2 DUAL II MAGNUM ROUNDUP POWERMAX AATREX N-PAK	1.33 pt/a A 32 fl oz/a B 2.4 pt/a B 2.5 % v/v B	A	0 -	97 -	97 -	0 -	100 a	99 a
3 DUAL II MAGNUM ROUNDUP POWERMAX TOUGH 5EC AATREX N-PAK	1.33 pt/a A 32 fl oz/a B 8 fl oz/a B 2.4 pt/a B 2.5 % v/v B	A	0 -	96 -	100 -	0 -	100 a	100 a
4 DUAL II MAGNUM ROUNDUP POWERMAX AATREX N-PAK	1.33 pt/a A 32 fl oz/a C 2.4 pt/a C 2.5 % v/v C	A				0 -	95 bc	97 b
5 DUAL II MAGNUM ROUNDUP POWERMAX TOUGH 5EC AATREX N-PAK	1.33 pt/a A 32 fl oz/a C 8 fl oz/a C 2.4 pt/a C 2.5 % v/v C	A				0 -	93 c	100 a
6 DUAL II MAGNUM ROUNDUP POWERMAX CALLISTO N-PAK	1.33 pt/a A 32 fl oz/a B 3 fl oz/a B 2.5 % v/v B	A	0 -	98 -	94 -	0 -	100 a	100 a
7 DUAL II MAGNUM ROUNDUP POWERMAX TOUGH 5EC CALLISTO N-PAK	1.33 pt/a A 32 fl oz/a B 8 fl oz/a B 3 fl oz/a B 2.5 % v/v B	A	0 -	98 -	100 -	0 -	100 a	100 a
8 DUAL II MAGNUM ROUNDUP POWERMAX CALLISTO N-PAK	1.33 pt/a A 32 fl oz/a C 3 fl oz/a C 2.5 % v/v C	A				0 -	95 bc	96 b
9 DUAL II MAGNUM ROUNDUP POWERMAX TOUGH 5EC CALLISTO N-PAK	1.33 pt/a A 32 fl oz/a C 8 fl oz/a C 3 fl oz/a C 2.5 % v/v C	A				0 -	96 abc	100 a
10 DUAL II MAGNUM ROUNDUP POWERMAX CALLISTO AATREX N-PAK	1.33 pt/a A 32 fl oz/a B 3 fl oz/a B 2.4 pt/a B 2.5 % v/v B	A	0 -	91 -	100 -	0 -	97 ab	100 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.

Untreated treatment(s) 1 excluded from analysis.

Missing data estimates are included in columns: Yates=13,14,15

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

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

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	1	1	1	1	1	1
Assessed By	T. Campbell	T. Campbell	T. Campbell	T. Campbell	T. Campbell	T. Campbell
Days After First/Last Applic.	28 6	28 6	28 6	36 8	36 8	36 8
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
11 DUAL II MAGNUM	1.33 pt/a	A	0 -	92 -	100 -	0 -
ROUNDUP POWERMAX	32 fl oz/a	B				100 a
TOUGH 5EC	8 fl oz/a	B				
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				0 -
ROUNDUP POWERMAX	32 fl oz/a	C				93 c
CALLISTO	3 fl oz/a	C				
AATREX	2.4 pt/a	C				
N-PAK	2.5 % v/v	C				
13 DUAL II MAGNUM	1.33 pt/a	A				0 -
ROUNDUP POWERMAX	32 fl oz/a	C				93 bc
TOUGH 5EC	8 fl oz/a	C				
CALLISTO	3 fl oz/a	C				
AATREX	2.4 pt/a	C				
N-PAK	2.5 % v/v	C				
14 DUAL II MAGNUM	1.33 pt/a	A	0 -	89 -	100 -	0 -
ROUNDUP POWERMAX	32 fl oz/a	B				97 ab
BCP1016 H (PREMIX)	16 fl oz/a	B				
N-PAK	2.5 % v/v	B				
15 DUAL II MAGNUM	1.33 pt/a	A				0 -
ROUNDUP POWERMAX	32 fl oz/a	C				92 c
BCP1016 H (PREMIX)	16 fl oz/a	C				
N-PAK	2.5 % v/v	C				
LSD P=.05				14.6	7.0	
Standard Deviation	0.0			9.8	4.7	0.0
CV	0.0			10.39	4.8	0.0
Levene's F	0.00			0.665	1.099	0.00
Levene's Prob(F)	0.00*			0.679	0.396	0.00*
Skewness	.			-2.7757*	-4.3654*	.
Kurtosis	.			8.0159*	19.9239*	.
Replicate F	0.000			0.711	1.815	0.000
Replicate Prob(F)	1.0000			0.5579	0.1805	1.0000
Treatment F	0.000			0.595	1.122	0.000
Treatment Prob(F)	1.0000			0.7305	0.3888	1.0000
						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.
 Untreated treatment(s) 1 excluded from analysis.
 Missing data estimates are included in columns: Yates=13,14,15
 Could not calculate LSD (% mean diff) for columns 1,4 because error mean square = 0.

Purdue Weed Science

Assessment of Pyridate + Mesotrione in Roundup System including late post emergence timing on Glyphosate Resistant Waterhemp					
Trial ID: 18S-MGS-Corn-13 (2)		Location: Meigs		Trial Year: 2018	
Protocol ID: 18S-MGS-Corn-13		Investigator: Dr. Bill Johnson			
Project ID:		Study Director: Taylor Campbell			
Sponsor Contact: Belchim - Dave Wright					

Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed
Pest Code	PANDI	AMATA	PANDI	AMATA	PANDI
Pest Name	Fall panicum	Common waterhe>	Fall panicum	Common waterhe>	Fall panicum
Crop Code					
Crop Name					
Part Rated	PLOT P	PLOT P	PLOT P	PLOT P	PLOT P
Rating Date	6/21/2018	6/21/2018	6/26/2018	6/26/2018	7/2/2018
Rating Type	EMERGE	EMERGE	EMERGE	EMERGE	EMERGE
Rating Unit	%	%	%	%	%
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.	45 17	45 17	50 22	50 22	56 28
Days After Emergence	40 DE-1	40 DE-1	45 DE-1	45 DE-1	51 DE-1
ARM Action Codes					
Number of Decimals	0	0	0	0	0
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	7	8	9
1 UNTREATED			0	0	0
2 DUAL II MAGNUM	1.33 pt/a	A	99 -	97 -	99 -
ROUNDUP POWERMAX	32 fl oz/a	B			
AATREX	2.4 pt/a	B			
N-PAK	2.5 % v/v	B			
3 DUAL II MAGNUM	1.33 pt/a	A	99 -	98 -	99 -
ROUNDUP POWERMAX	32 fl oz/a	B			
TOUGH 5EC	8 fl oz/a	B			
AATREX	2.4 pt/a	B			
N-PAK	2.5 % v/v	B			
4 DUAL II MAGNUM	1.33 pt/a	A	100 -	100 -	100 -
ROUNDUP POWERMAX	32 fl oz/a	C			
AATREX	2.4 pt/a	C			
N-PAK	2.5 % v/v	C			
5 DUAL II MAGNUM	1.33 pt/a	A	99 -	100 -	99 -
ROUNDUP POWERMAX	32 fl oz/a	C			
TOUGH 5EC	8 fl oz/a	C			
AATREX	2.4 pt/a	C			
N-PAK	2.5 % v/v	C			
6 DUAL II MAGNUM	1.33 pt/a	A	100 -	99 -	100 -
ROUNDUP POWERMAX	32 fl oz/a	B			
CALLISTO	3 fl oz/a	B			
N-PAK	2.5 % v/v	B			
7 DUAL II MAGNUM	1.33 pt/a	A	99 -	99 -	98 -
ROUNDUP POWERMAX	32 fl oz/a	B			
TOUGH 5EC	8 fl oz/a	B			
CALLISTO	3 fl oz/a	B			
N-PAK	2.5 % v/v	B			
8 DUAL II MAGNUM	1.33 pt/a	A	100 -	100 -	100 -
ROUNDUP POWERMAX	32 fl oz/a	C			
CALLISTO	3 fl oz/a	C			
N-PAK	2.5 % v/v	C			
9 DUAL II MAGNUM	1.33 pt/a	A	98 -	100 -	98 -
ROUNDUP POWERMAX	32 fl oz/a	C			
TOUGH 5EC	8 fl oz/a	C			
CALLISTO	3 fl oz/a	C			
N-PAK	2.5 % v/v	C			
10 DUAL II MAGNUM	1.33 pt/a	A	97 -	100 -	95 -
ROUNDUP POWERMAX	32 fl oz/a	B			
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=13,14,15
 Could not calculate LSD (% mean diff) for columns 1,4 because error mean square = 0.

Purdue Weed Science

Assessment of Pyridate + Mesotrione in Roundup System including late post emergence timing on Glyphosate Resistant Waterhemp

Trial ID: 18S-MGS-Corn-13 (2) Location: Meigs Trial Year: 2018
 Protocol ID: 18S-MGS-Corn-13 Investigator: Dr. Bill Johnson
 Project ID: Study Director: Taylor Campbell
 Sponsor Contact: Belchim - Dave Wright

Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed
Pest Code	PANDI	AMATA	PANDI	AMATA	PANDI
Pest Name	Fall panicum	Common waterhe>	Fall panicum	Common waterhe>	Fall panicum
Crop Code					
Crop Name					
Part Rated					
Rating Date	PLOT P 6/21/2018	PLOT P 6/21/2018	PLOT P 6/26/2018	PLOT P 6/26/2018	PLOT P 7/2/2018
Rating Type	EMERGE	EMERGE	EMERGE	EMERGE	EMERGE
Rating Unit	%	%	%	%	%
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.	45 17	45 17	50 22	50 22	56 28
Days After Emergence	40 DE-1	40 DE-1	45 DE-1	45 DE-1	51 DE-1
ARM Action Codes					
Number of Decimals	0	0	0	0	0
Trt Treatment	Rate Appl				
No. Name	Rate Unit Code	7	8	9	10
11 DUAL II MAGNUM	1.33 pt/a A	99 -	100 -	99 -	100 -
ROUNDUP POWERMAX	32 fl oz/a B				
TOUGH 5EC	8 fl oz/a B				
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	98 -	100 -	100 -	100 -
ROUNDUP POWERMAX	32 fl oz/a C				
CALLISTO	3 fl oz/a C				
AATREX	2.4 pt/a C				
N-PAK	2.5 % v/v C				
13 DUAL II MAGNUM	1.33 pt/a A	100 -	100 -	100 -	100 -
ROUNDUP POWERMAX	32 fl oz/a C				
TOUGH 5EC	8 fl oz/a C				
CALLISTO	3 fl oz/a C				
AATREX	2.4 pt/a C				
N-PAK	2.5 % v/v C				
14 DUAL II MAGNUM	1.33 pt/a A	98 -	100 -	98 -	100 -
ROUNDUP POWERMAX	32 fl oz/a B				
BCP1016 H (PREMIX)	16 fl oz/a B				
N-PAK	2.5 % v/v B				
15 DUAL II MAGNUM	1.33 pt/a A	99 -	100 -	99 -	100 -
ROUNDUP POWERMAX	32 fl oz/a C				
BCP1016 H (PREMIX)	16 fl oz/a C				
N-PAK	2.5 % v/v C				
LSD P=.05	4.4	2.3	4.5	2.3	5.9
Standard Deviation	3.1	1.6	3.1	1.6	4.1
CV	3.11	1.61	3.17	1.61	4.25
Levene's F	2.469	2.034	1.072	2.034	1.996
Levene's Prob(F)	0.93	0.041*	0.407	0.041*	0.046*
Skewness	-2.2185*	-3.5586*	-2.1656*	-3.5586*	-1.4342*
Kurtosis	3.8392*	13.5176*	3.3337*	13.5176*	2.6171*
Replicate F	1.305	4.005	1.262	4.005	0.482
Replicate Prob(F)	0.2864	0.0141	0.3007	0.0141	0.6969
Treatment F	0.455	1.624	0.832	1.624	1.472
Treatment Prob(F)	0.9363	0.1201	0.6257	0.1201	0.1721

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=13,14,15

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

Purdue Weed Science

Assessment of Pyridate + Mesotrione in Roundup System including late post emergence timing on Glyphosate Resistant Waterhemp
 Trial ID: 18S-MGS-Corn-13 (2) Location: Meigs Trial Year: 2018
 Protocol ID: 18S-MGS-Corn-13 Investigator: Dr. Bill Johnson
 Project ID: Study Director: Taylor Campbell
 Sponsor Contact: Belchim - Dave Wright

Pest Type	W Weed					
Pest Code	AMATA					
Pest Name	Common waterhe>					
Crop Code	ZEAMX		ZEAMX			
Crop Name	Corn		Corn			
Part Rated	PLOT P	PLOT C	PLOT C	PLOT C		
Rating Date	7/2/2018	10/17/2018	10/17/2018	10/17/2018		
Rating Type	EMERGE	YIELD	MOICON	YIELD		
Rating Unit	%	lb/plot	%	BU		
Number of Subsamples	1	1	1	1		
Assessed By	T. Campbell	T. Campbell	T. Campbell	T. Campbell		
Days After First/Last Applic.	56 28	163 135	163 135	163 135		
Days After Emergence	51 DE-1	158 DE-1	158 DE-1	158 DE-1		
ARM Action Codes				TY1		
Number of Decimals	0	1	1	1		
Trt Treatment	Rate	Appl				
No. Name	Rate Unit	Code	12	13	14	15
1 UNTREATED			0	19.4	17.2	117.9
2 DUAL II MAGNUM ROUNDUP POWERMAX AATREX N-PAK	1.33 pt/a 32 fl oz/a 2.4 pt/a 2.5 % v/v	A B B B	95 -	27.3 abc	17.3 -	165.4 abc
3 DUAL II MAGNUM ROUNDUP POWERMAX TOUGH 5EC AATREX N-PAK	1.33 pt/a 32 fl oz/a 8 fl oz/a 2.4 pt/a 2.5 % v/v	A B B B B	98 -	22.1 a-d	17.1 -	134.0 a-e
4 DUAL II MAGNUM ROUNDUP POWERMAX AATREX N-PAK	1.33 pt/a 32 fl oz/a 2.4 pt/a 2.5 % v/v	A C C C	100 -	27.0 abc	17.4 -	163.1 a-d
5 DUAL II MAGNUM ROUNDUP POWERMAX TOUGH 5EC AATREX N-PAK	1.33 pt/a 32 fl oz/a 8 fl oz/a 2.4 pt/a 2.5 % v/v	A C C C C	100 -	26.1 abc	17.4 -	158.0 a-d
6 DUAL II MAGNUM ROUNDUP POWERMAX CALLISTO N-PAK	1.33 pt/a 32 fl oz/a 3 fl oz/a 2.5 % v/v	A B B B	98 -	19.0 cd	17.3 -	115.0 cde
7 DUAL II MAGNUM ROUNDUP POWERMAX TOUGH 5EC CALLISTO N-PAK	1.33 pt/a 32 fl oz/a 8 fl oz/a 3 fl oz/a 2.5 % v/v	A B B B B	99 -	22.6 a-d	17.9 -	135.8 a-e
8 DUAL II MAGNUM ROUNDUP POWERMAX CALLISTO N-PAK	1.33 pt/a 32 fl oz/a 3 fl oz/a 2.5 % v/v	A C C C	100 -	21.2 a-d	17.5 -	128.0 a-e
9 DUAL II MAGNUM ROUNDUP POWERMAX TOUGH 5EC CALLISTO N-PAK	1.33 pt/a 32 fl oz/a 8 fl oz/a 3 fl oz/a 2.5 % v/v	A C C C C	100 -	29.6 a	17.7 -	178.3 a
10 DUAL II MAGNUM ROUNDUP POWERMAX CALLISTO AATREX N-PAK	1.33 pt/a 32 fl oz/a 3 fl oz/a 2.4 pt/a 2.5 % v/v	A B B B B	100 -	20.3 bcd	17.4 -	122.7 b-e

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=13,14,15
 Could not calculate LSD (% mean diff) for columns 1,4 because error mean square = 0.

Purdue Weed Science

Assessment of Pyridate + Mesotrione in Roundup System including late post emergence timing on Glyphosate Resistant Waterhemp

Trial ID: 18S-MGS-Corn-13 (2) Location: Meigs Trial Year: 2018
 Protocol ID: 18S-MGS-Corn-13 Investigator: Dr. Bill Johnson
 Project ID: Study Director: Taylor Campbell
 Sponsor Contact: Belchim - Dave Wright

Pest Type		W Weed			
Pest Code		AMATA			
Pest Name		Common waterhe>			
Crop Code			ZEAMX	ZEAMX	ZEAMX
Crop Name			Corn	Corn	Corn
Part Rated		PLOT P	PLOT C	PLOT C	PLOT C
Rating Date		7/2/2018	10/17/2018	10/17/2018	10/17/2018
Rating Type		EMERGE	YIELD	MOICON	YIELD
Rating Unit		%	lb/plot	%	BU
Number of Subsamples		1	1	1	1
Assessed By		T. Campbell	T. Campbell	T. Campbell	T. Campbell
Days After First/Last Applic.		56 28	163 135	163 135	163 135
Days After Emergence		51 DE-1	158 DE-1	158 DE-1	158 DE-1
ARM Action Codes					TY1
Number of Decimals		0	1	1	1
Trt Treatment	Rate Appl				
No. Name	Rate Unit Code	12	13	14	15
11 DUAL II MAGNUM	1.33 pt/a A	96 -	27.9 ab	17.5 -	168.6 ab
ROUNDUP POWERMAX	32 fl oz/a B				
TOUGH 5EC	8 fl oz/a B				
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 -	20.7 bcd	17.8 -	124.7 b-e
ROUNDUP POWERMAX	32 fl oz/a C				
CALLISTO	3 fl oz/a C				
AATREX	2.4 pt/a C				
N-PAK	2.5 % v/v C				
13 DUAL II MAGNUM	1.33 pt/a A	100 -	18.9 cd	17.5 -	114.1 cde
ROUNDUP POWERMAX	32 fl oz/a C				
TOUGH 5EC	8 fl oz/a C				
CALLISTO	3 fl oz/a C				
AATREX	2.4 pt/a C				
N-PAK	2.5 % v/v C				
14 DUAL II MAGNUM	1.33 pt/a A	96 -	18.8 cd	17.7 -	113.0 de
ROUNDUP POWERMAX	32 fl oz/a B				
BCP1016 H (PREMIX)	16 fl oz/a B				
N-PAK	2.5 % v/v B				
15 DUAL II MAGNUM	1.33 pt/a A	100 -	14.0 d	17.8 -	84.5 e
ROUNDUP POWERMAX	32 fl oz/a C				
BCP1016 H (PREMIX)	16 fl oz/a C				
N-PAK	2.5 % v/v C				
LSD P=.05		4.5	8.61	0.65	51.80
Standard Deviation		3.1	5.97	0.45	35.92
CV		3.17	26.49	2.57	26.39
Levene's F		1.438	0.334	0.707	0.343
Levene's Prob(F)		0.183	0.981	0.744	0.979
Skewness		-3.0239*	-0.081	0.3822	-0.0996
Kurtosis		8.8702*	-0.8386	-0.3784	-0.839
Replicate F		2.805	3.499	2.606	3.567
Replicate Prob(F)		0.0523	0.0270	0.0694	0.0252
Treatment F		1.400	2.229	0.971	2.245
Treatment Prob(F)		0.2029	0.0334	0.4989	0.0322

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=13,14,15

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

Purdue Weed Science

Assessment of Pyridate + Mesotrione in Roundup System including late post emergence timing on Glyphosate Resistant Waterhemp

Trial ID: 18S-MGS-Corn-13 (2)	Location: Meigs	Trial Year: 2018
Protocol ID: 18S-MGS-Corn-13	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

TY1 = 6.222857*[13]*(100-@MVAVGREP([14]))/85