

Purdue Weed Science

Engenia Plus Graminicide Efficacy

Trial ID: 17S-TPAC-SOY-15 Location: TPAC Trial Year: 2017
 Protocol ID: 17S-TPAC-SOY-15 Investigator: Dr. Bill Johnson
 Project ID: MKD-H-2017-US-D01-A-01.0 Study Director: Dustin Johnson
 Sponsor Contact: G. Welker - BASF

General Trial Information

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

Discipline: H herbicide
Trial Status: E established
Initiation Date: May-17-2017

Trial Location

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

Latitude of LL Corner °: 40.29342 N
Longitude of LL Corner °: 40.29342 W

Conducted Under GLP: No
Conducted Under GEP: No

Contacts

Study Director: Dustin Johnson **Title:** Research Associate
Organization: Purdue University
Address: 915 W. State Street
City+State/Prov: West Lafayette, IN
Postal Code: 47907 **E-mail:** john1357@purdue.edu
Country: USA United States

Investigator: Dr. Bill Johnson **Title:** Professor
Organization: Purdue University
Address: 915 W. State Street
City+State/Prov: West Lafayette, IN
Postal Code: 47907 **E-mail:** wgj@purdue.edu
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: GLXMA Glycine max Soybean
Variety: XTEND AG30X6
Description: DICAMBA/RR

Planting Rate, Unit: 140000 S/A **Planting Date:** May-18-2017
Depth, Unit: 1.25 IN **Planting Method:** PLANTD planted
Row Spacing, Unit: 15 IN **Planting Equipment:** PP Plot Planter
Soil Temperature, Unit: 75 F **Emergence Date:** May-27-2017
Soil Moisture: DRY dry

Pest Description

Pest 1 Type: W **Code:** ZEAMX Zea mays
Common Name: Corn

Site and Design

Treated Plot Width: 10 FT **Site Type:** FIELD field
Treated Plot Length: 30 FT **Experimental Unit:** 1 PLOT plot
Treated Plot Area: 300 FT2 **Treatments:** 5 **Tillage Type:** CONTIL conventional-till
Replications: 4 **Study Design:** RACOB Randomized Complete Block (RCB)

Field Prep./Maintenance:
 5/18/17 Sprayed Blanket application of Verdit @ 5 oz/a and Zidua @ 2 oz/a

Soil Description

Description Name: TPAC- Field 4A
% OM: 2.9 **Texture:** SIL silt loam
pH: 6.2 **Soil Name:** Toronto-Millbrook
CEC: 13.3

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Application Description

	A	B
Application Date:	Jun-8-2017	Jun-8-2017
Appl. Start Time:	4:50 PM	4:50 PM
Appl. Stop Time:	5:00 PM	5:00 PM
Application Method:	SPRAY	SPRAY
Application Timing:	POSPOS	POSPOS
Application Placement:	BROADC	BROADC
Applied By:	J. HARMON	D. JOHNSON
Air Temperature, Unit:	91 F	91 F
% Relative Humidity:	50	50
Wind Velocity, Unit:	5 MPH	5 MPH
Wind Direction:	NE	NE
Dew Presence (Y/N):	N no	N no
Soil Temperature, Unit:	82 F	82 F
Soil Moisture:	DRY	DRY
% Cloud Cover:	5	5

Crop Stage At Each Application

	A	B
Crop 1 Code, BBCH Scale:	GLXMA BSOY	GLXMA BSOY
Stage Scale Used:	BBCH	BBCH
Stage Majority, Percent:	11	11
Stage Minimum, Percent:	11	11
Stage Maximum, Percent:	12	12
Height, Unit:	2 IN	2 IN
Height Minimum, Maximum:	1 3	1 3

Pest Stage At Each Application

	A	B
Pest 1 Code, Type, Scale:	ZEAMX W	ZEAMX W
Stage Majority, Percent:	13	13
Stage Minimum, Percent:	12	12
Stage Maximum, Percent:	14	14
Height, Unit:	5 IN	5 IN
Height Minimum, Maximum:	2 6	2 6
Density, Unit:	14 FT2	14 FT2

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Application Equipment

	A	B
Appl. Equipment:	CO2 BACKPACK	CO2 BACKPACK
Equipment Type:	BACSPR	BACSPR
Operation Pressure, Unit:	29 PSI	29 PSI
Nozzle Type:	AIXR	TTI
Nozzle Size:	110015	TTI110015
Nozzle Spacing, Unit:	15 IN	15 IN
Nozzles/Row:	8	8
Boom Length, Unit:	10 FT	10 FT
Boom Height, Unit:	17 IN	17 IN
Ground Speed, Unit:	3 MPH	3 MPH
Carrier:	WATER	WATER
Spray Volume, Unit:	15 GAL/AC	15 GAL/AC
Mix Size, Unit:	1.8 liters	1.8 liters
Propellant:	COMCO2	COMCO2

Trial Comments

5/17/17-Planted volunteer corn Rows 3&5 with RR/LL stacked corn around 20,000 seeds/acre along with 3 corn ears between rows 2&3 and 5&6.

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Reps: 4 Plots: 10 by 30 feet
 Spray vol: 15 GAL/AC Mix Size: 1.8 liters (1.5642 liters calculated mix size)

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
1	UNTREATED CHECK							101	202	301	403
2	SELECT MAX	0.97	LB/GAL	L	6.0 fl oz/a	A	5.625 ml/mx	102	203	302	405
	ROUNDUP POWERMAX	4.5	LBAE/GAL	SL	32.0 fl oz/a	A	30.0 ml/mx				
	COC	100	%	SL	1.0 % v/v	A	18.0 ml/mx				
	N-PAK AMS	3.4	LBA/GAL	L	2.5 % v/v	A	45.0 ml/mx				
3	ENGENIA	5	LB/GAL	SL	12.8 fl oz/a	B	12.0 ml/mx	103	201	304	402
	SELECT MAX	0.97	LB/GAL	L	6.0 fl oz/a	B	5.625 ml/mx				
	ROUNDUP POWERMAX	4.5	LBAE/GAL	SL	32.0 fl oz/a	B	30.0 ml/mx				
	MSO	100	%	SL	1.0 % v/v	B	18.0 ml/mx				
	CLASS ACT RIDION	100	%	L	1.0 % v/v	B	18.0 ml/mx				
4	ENGENIA	5	LB/GAL	SL	12.8 fl oz/a	B	12.0 ml/mx	104	205	303	404
	ASSURE II	0.88	LB/GAL	EC	4.0 fl oz/a	B	3.75 ml/mx				
	ROUNDUP POWERMAX	4.5	LBAE/GAL	SL	32.0 fl oz/a	B	30.0 ml/mx				
	MSO	100	%	SL	1.0 % v/v	B	18.0 ml/mx				
	CLASS ACT RIDION	100	%	L	1.0 % v/v	B	18.0 ml/mx				
5	ENGENIA	5	LB/GAL	SL	12.8 fl oz/a	B	12.0 ml/mx	105	204	305	401
	RAPTOR	1	LB/GAL	SL	4.0 fl oz/a	B	3.75 ml/mx				
	ROUNDUP POWERMAX	4.5	LBAE/GAL	SL	32.0 fl oz/a	B	30.0 ml/mx				
	MSO	100	%	SL	1.0 % v/v	B	18.0 ml/mx				
	CLASS ACT RIDION	100	%	L	1.0 % v/v	B	18.0 ml/mx				

Sort Order: 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
14.062	ml	SELECT MAX	.97	LB/GAL	L	
150.000	ml	ROUNDUP POWERMAX	4.5	LBAE/GAL	SL	
22.498	ml	COC	100	%	SL	
56.244	ml	N-PAK AMS	3.4	LBA/GAL	L	
45.000	ml	ENGENIA	5	LB/GAL	SL	
67.493	ml	MSO	100	%	SL	
67.493	ml	CLASS ACT RIDION	100	%	L	
4.687	ml	ASSURE II	.88	LB/GAL	EC	
4.687	ml	RAPTOR	1	LB/GAL	SL	

* 'Per area' calculations based on spray volume= 15 GAL/AC, mix size= 1.8 liters (mix size basis).

* Product amount calculations increased 25 % for overage adjustment.

* 'Per volume' calculations use spray volume= 15 GAL/AC, mix size= 1.8 liters.

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Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed
Pest Code	ZEAMX	ZEAMX	ZEAMX	ZEAMX	ZEAMX
Pest Name	Corn	Corn	Corn	Corn	Corn
Crop Code	GLXMA	GLXMA	GLXMA	GLXMA	GLXMA
Crop Name	Soybean	Soybean	Soybean	Soybean	Soybean
Part Rated	PLOT -	PLOT -	PLOT -	PLOT -	PLOT -
Rating Date	Jun-14-2017	Jun-14-2017	Jun-21-2017	Jun-21-2017	Jun-21-2017
Rating Type	CONTRO	PHYGEN	ROW	CLUSTER	PHYGEN
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Assessed By	D. JOHNSON	D. JOHNSON	M. ZIMMER	M. ZIMMER	M. ZIMMER
Rating Timing	A1	A1	A2	A2	A2
Days After First/Last Applic.	6 6	6 6	13 13	13 13	13 13
Days After Emergence	18 DE-1	18 DE-1	25 DE-1	25 DE-1	25 DE-1
ARM Action Codes	P	P	P	P	P
Number of Decimals	0	0	0	0	0
Trt Treatment	Rate	Rate	Rate	Rate	Rate
No. Name	Unit	Unit	Unit	Unit	Unit
	Code	Code	Code	Code	Code
	1	2	3	4	5
1 UNTREATED CHECK	0 d	0 a	0 d	0 c	0 a
2 SELECT MAX	6.0 fl oz/a A	0 a	93 a	60 a	0 a
ROUNDUP POWERMAX	32.0 fl oz/a A				
COC	1.0 % v/v A				
N-PAK AMS	2.5 % v/v A				
3 ENGENIA	12.8 fl oz/a B	0 a	97 a	64 a	0 a
SELECT MAX	6.0 fl oz/a B				
ROUNDUP POWERMAX	32.0 fl oz/a B				
MSO	1.0 % v/v B				
CLASS ACT RIDION	1.0 % v/v B				
4 ENGENIA	12.8 fl oz/a B	0 a	86 b	38 b	0 a
ASSURE II	4.0 fl oz/a B				
ROUNDUP POWERMAX	32.0 fl oz/a B				
MSO	1.0 % v/v B				
CLASS ACT RIDION	1.0 % v/v B				
5 ENGENIA	12.8 fl oz/a B	1 a	74 c	34 b	0 a
RAPTOR	4.0 fl oz/a B				
ROUNDUP POWERMAX	32.0 fl oz/a B				
MSO	1.0 % v/v B				
CLASS ACT RIDION	1.0 % v/v B				
LSD P=.05	6.4	1.0	5.1	11.4	.
Standard Deviation	4.1	0.7	3.3	7.4	0.0
CV	8.48	268.33	4.75	19.05	0.0
Bartlett's X2	2.872	0.0	6.001	8.398	0.0
P(Bartlett's X2)	0.238	.	0.112	0.038*	.
Skewness	-1.2144*	3.1114*	-1.4177*	-0.4979	.
Kurtosis	0.1004	9.0484*	0.3453	-1.0669	.
Replicate F	0.268	1.000	1.773	1.509	0.000
Replicate Prob(F)	0.8470	0.4262	0.2057	0.2623	1.0000
Treatment F	190.610	2.778	582.194	47.174	0.000
Treatment Prob(F)	0.0001	0.0761	0.0001	0.0001	1.0000

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls)
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
 Could not calculate LSD (% mean diff) for columns 5 because error mean square = 0.

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Pest Type	W Weed	W Weed	W Weed
Pest Code	ZEAMX	ZEAMX	ZEAMX
Pest Name	Corn	Corn	Corn
Crop Code	GLXMA	GLXMA	GLXMA
Crop Name	Soybean	Soybean	Soybean
Part Rated	PLOT -	PLOT -	PLOT -
Rating Date	Jun-28-2017	Jul-6-2017	Jul-6-2017
Rating Type	CLUSTER	ROW	CLUSTER
Rating Unit	%	%	%
Number of Subsamples	1	1	1
Assessed By	M. ZIMMER	M. ZIMMER	M. ZIMMER
Rating Timing	A3	A4	A4
Days After First/Last Applic.	20 20	28 28	28 28
Days After Emergence	32 DE-1	40 DE-1	40 DE-1
ARM Action Codes	P	P	P
Number of Decimals	0	0	0

Trt Treatment	Rate	Appl	
No. Name	Rate Unit	Code	
			7 8 9
1 UNTREATED CHECK			0 c 0 c 0 c
2 SELECT MAX	6.0 fl oz/a A		55 a 100 a 59 a
ROUNDUP POWERMAX	32.0 fl oz/a A		
COC	1.0 % v/v A		
N-PAK AMS	2.5 % v/v A		
3 ENGENIA	12.8 fl oz/a B		51 a 99 a 58 a
SELECT MAX	6.0 fl oz/a B		
ROUNDUP POWERMAX	32.0 fl oz/a B		
MSO	1.0 % v/v B		
CLASS ACT RIDION	1.0 % v/v B		
4 ENGENIA	12.8 fl oz/a B		30 b 90 b 39 b
ASSURE II	4.0 fl oz/a B		
ROUNDUP POWERMAX	32.0 fl oz/a B		
MSO	1.0 % v/v B		
CLASS ACT RIDION	1.0 % v/v B		
5 ENGENIA	12.8 fl oz/a B		53 a 99 a 61 a
RAPTOR	4.0 fl oz/a B		
ROUNDUP POWERMAX	32.0 fl oz/a B		
MSO	1.0 % v/v B		
CLASS ACT RIDION	1.0 % v/v B		
LSD P=.05			8.4 3.4 10.2
Standard Deviation			5.5 2.2 6.6
CV			14.51 2.81 15.33
Bartlett's X2			5.421 8.136 4.853
P(Bartlett's X2)			0.143 0.017* 0.183
Skewness			-0.8861 -1.5821* -1.0167
Kurtosis			-0.7977 0.6232 -0.371
Replicate F			4.264 0.869 1.166
Replicate Prob(F)			0.0288 0.4841 0.3632
Treatment F			72.750 1595.795 60.469
Treatment Prob(F)			0.0001 0.0001 0.0001

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls)
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
 Could not calculate LSD (% mean diff) for columns 5 because error mean square = 0.

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Sponsor Contact: G. Welker - BASF

Pest Type

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

Pest Code

ZEAMX, Zea mays, Corn = US

Crop Code

GLXMA, BSOY, Glycine max, Soybean = US

Part Rated

PLOT = plot

Rating Type

CONTRO = control / burndown or knockdown

PHYGEN = phytotoxicity - general / injury

Rating Unit

% = percent

Rating Timing

A1 = 1st Assessment According to Trial Schedule

A2 = 2nd Assessment According to trial Schedule

A3 = 3rd Assessment According to Trial Schedule

A4 = 4th Assessment According to Trial Schedule

ARM Action Codes

P = Rating scale of 0 to 100 (e.g. % control or injury)

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Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed			
Pest Code	ZEAMX	ZEAMX	ZEAMX	ZEAMX	ZEAMX			
Pest Name	Corn	Corn	Corn	Corn	Corn			
Crop Code	GLXMA	GLXMA	GLXMA	GLXMA	GLXMA			
Crop Name	Soybean	Soybean	Soybean	Soybean	Soybean			
Part Rated	PLOT -	PLOT -	PLOT -	PLOT -	PLOT -			
Rating Date	Jun-14-2017	Jun-14-2017	Jun-21-2017	Jun-21-2017	Jun-21-2017			
Rating Type	CONTRO	PHYGEN	ROW	CLUSTER	PHYGEN			
Rating Unit	%	%	%	%	%			
Number of Subsamples	1	1	1	1	1			
Assessed By	D. JOHNSON	D. JOHNSON	M. ZIMMER	M. ZIMMER	M. ZIMMER			
Rating Timing	A1	A1	A2	A2	A2			
Days After First/Last Applic.	6 6	6 6	13 13	13 13	13 13			
Days After Emergence	18 DE-1	18 DE-1	25 DE-1	25 DE-1	25 DE-1			
ARM Action Codes	P	P	P	P	P			
Number of Decimals	0	0	0	0	0			
Trt Treatment	Rate	Appl	Trt Treatment					
No. Name	Rate Unit	Code Plot	1	2	3	4	5	6
1 UNTREATED CHECK		101	0	0	0	0	0	0
		202	0	0	0	0	0	0
		301	0	0	0	0	0	0
		403	0	0	0	0	0	0
		Mean =	0	0	0	0	0	0
2 SELECT MAX	6.0 fl oz/a A	102	65	0	90	60	0	98
ROUNDUP POWERMAX	32.0 fl oz/a A	203	60	0	90	50	0	99
COC	1.0 % v/v A	302	60	0	95	65	0	100
N-PAK AMS	2.5 % v/v A	405	55	0	95	65	0	98
		Mean =	60	0	93	60	0	99
3 ENGENIA	12.8 fl oz/a B	103	75	0	95	65	0	99
SELECT MAX	6.0 fl oz/a B	201	75	0	95	60	0	100
ROUNDUP POWERMAX	32.0 fl oz/a B	304	75	0	98	65	0	99
MSO	1.0 % v/v B	402	70	0	98	65	0	99
CLASS ACT RIDION	1.0 % v/v B							
		Mean =	74	0	97	64	0	99
4 ENGENIA	12.8 fl oz/a B	104	50	0	80	30	0	90
ASSURE II	4.0 fl oz/a B	205	60	0	80	30	0	95
ROUNDUP POWERMAX	32.0 fl oz/a B	303	65	0	90	30	0	96
MSO	1.0 % v/v B	404	65	0	93	60	0	96
CLASS ACT RIDION	1.0 % v/v B							
		Mean =	60	0	86	38	0	94
5 ENGENIA	12.8 fl oz/a B	105	50	0	75	30	0	98
RAPTOR	4.0 fl oz/a B	204	50	0	75	40	0	99
ROUNDUP POWERMAX	32.0 fl oz/a B	305	50	3	75	30	0	99
MSO	1.0 % v/v B	401	50	2	70	35	0	98
CLASS ACT RIDION	1.0 % v/v B							
		Mean =	50	1	74	34	0	99

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Crop Name	Soybean	Soybean	Soybean
Part Rated	PLOT -	PLOT -	PLOT -
Rating Date	Jun-28-2017	Jul-6-2017	Jul-6-2017
Rating Type	CLUSTER	ROW	CLUSTER
Rating Unit	%	%	%
Number of Subsamples	1	1	1
Assessed By	M. ZIMMER	M. ZIMMER	M. ZIMMER
Rating Timing	A3	A4	A4
Days After First/Last Applic.	20 20	28 28	28 28
Days After Emergence	32 DE-1	40 DE-1	40 DE-1
ARM Action Codes	P	P	P
Number of Decimals	0	0	0

Trt Treatment	Rate	Appl	7	8	9
No. Name	Rate Unit	Code Plot			
1 UNTREATED CHECK		101	0	0	0
		202	0	0	0
		301	0	0	0
		403	0	0	0
		Mean =	0	0	0
2 SELECT MAX	6.0 fl oz/a A	102	50	100	60
ROUNDUP POWERMAX	32.0 fl oz/a A	203	50	100	55
COC	1.0 % v/v A	302	60	100	60
N-PAK AMS	2.5 % v/v A	405	60	100	60
		Mean =	55	100	59
3 ENGENIA	12.8 fl oz/a B	103	50	100	65
SELECT MAX	6.0 fl oz/a B	201	50	100	55
ROUNDUP POWERMAX	32.0 fl oz/a B	304	50	95	50
MSO	1.0 % v/v B	402	55	100	60
CLASS ACT RIDION	1.0 % v/v B				
		Mean =	51	99	58
4 ENGENIA	12.8 fl oz/a B	104	20	85	35
ASSURE II	4.0 fl oz/a B	205	20	95	35
ROUNDUP POWERMAX	32.0 fl oz/a B	303	40	90	35
MSO	1.0 % v/v B	404	40	90	50
CLASS ACT RIDION	1.0 % v/v B				
		Mean =	30	90	39
5 ENGENIA	12.8 fl oz/a B	105	40	99	45
RAPTOR	4.0 fl oz/a B	204	55	99	65
ROUNDUP POWERMAX	32.0 fl oz/a B	305	60	100	65
MSO	1.0 % v/v B	401	55	99	70
CLASS ACT RIDION	1.0 % v/v B				
		Mean =	53	99	61

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Pest Type

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

Pest Code

ZEAMX, Zea mays, Corn = US

Crop Code

GLXMA, BSOY, Glycine max, Soybean = US

Part Rated

PLOT = plot

Rating Type

CONTRO = control / burndown or knockdown

PHYGEN = phytotoxicity - general / injury

Rating Unit

% = percent

Rating Timing

A1 = 1st Assessment According to Trial Schedule

A2 = 2nd Assessment According to trial Schedule

A3 = 3rd Assessment According to Trial Schedule

A4 = 4th Assessment According to Trial Schedule

ARM Action Codes

P = Rating scale of 0 to 100 (e.g. % control or injury)