

The Ohio State University

Liberty Link control systems and increased Liberty rates

Trial ID: 18 LLDEMO

Protocol ID: 18 LLDEMO

Project ID: AWGK/SULFSOY.03/H050SMAD

Location:

Investigator: Dr. Mark M. Loux

Study Director: Bryan Reeb

Sponsor Contact: Dave Lamore/Joe Reed/Dain Bruins/TonyE

Trial Year: 2018

General Trial Information**Study Director:** Bryan Reeb
Investigator: Dr. Mark M. Loux**Discipline:** H herbicide
Initiation Date: May-11-2018**Trial Location****City:** South Charleston **Country:** USA United States
State/Prov.: Ohio
Postal Code: 45368 **Climate Zone:** USWARM US Warm Continental**Latitude of LL Corner °:** 39.85598 N
Longitude of LL Corner °: 83.67152 W
Altitude of LL Corner, Unit: 1086.00 FT**Conducted Under GLP:** No
Conducted Under GEP: No**Contacts****Study Director:** Bryan Reeb**Cooperator/Landowner****Cooperator:** Tony Estes
Organization: UPI**E-mail:** tony.estes@uniphos.com**Crop Description****Crop 1:** GLXMA Glycine max Soybean
Variety: Credenz 3841 LL **BBCH Scale:** BSOY
Description: Credenz**Planting Rate, Unit:** 164000 S/A
Depth, Unit: 1.25 IN
Row Spacing, Unit: 15 IN**Planting Date:** May-10-2018
Planting Method: PLANTD planted
Planting Equipment: FE field equipment
Emergence Date: May-17-2018**Soil Temperature, Unit:** 70 F
Soil Moisture: NORMAL normal, adequate
Seed Bed: MEDIUM medium**Harvested Width, Unit:** 6.25 FT
Harvested Length, Unit: 30 FT
% Standard Moisture: 13.5**Pest Description****Pest 1 Type:** W **Code:** SETFA *Setaria faberi*
Common Name: Giant foxtail**Pest 2 Type:** W **Code:** ECHCG *Echinochloa crus-galli*
Common Name: Common barnyard grass**Pest 3 Type:** W **Code:** AMBTR *Ambrosia trifida*
Common Name: Giant ragweed**Pest 4 Type:** W **Code:** AMARE *Amaranthus retroflexus*
Common Name: Redroot pigweed**Pest 5 Type:** W **Code:** CHEAL *Chenopodium album*
Common Name: common lambsquarters**Pest 6 Type:** W **Code:** ABUTH *Abutilon theophrasti*
Common Name: velvetleaf**Pest 7 Type:** W **Code:** IPOHE *Ipomoea hederacea*
Common Name: ivy-leaf morning glory**Pest 8 Type:** W **Code:** HIBTR *Hibiscus trionum*
Common Name: Venice mallow**Pest 9 Type:** W **Code:** SIDSP *Sida spinosa*
Common Name: Prickly sida**Site and Design****Treated Plot Width:** 10 FT
Treated Plot Length: 30 FT
Treated Plot Area: 300 FT² **Treatments:** 16
Replications: 3**Site Type:** FIELD field
Experimental Unit: 1 PLOT plot
Tillage Type: CONTIL conventional-till
Study Design: RACOBL Randomized Complete Block (RCB)

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No. Previous Crop Year

1. Pumpkins 2017

Soil Description

Description Name: F-6

% Sand: 37 % OM: 1.7 Texture: L loam
 % Silt: 49 pH: 6.1 Soil Name: Strawn Crosby
 % Clay: 15 CEC: 10.3 Fert. Level: G good
 Soil Drainage: G good

Application Description

	A	B	C	D	E	F	G
Application Date:	May-11-2018	Jun-6-2018	Jun-7-2018	Jun-14-2018	Jun-14-2018	Jun-26-2018	Jun-28-2018
Appl. Start Time:	7:30 AM	8:30 AM	11:00 AM	11:00 AM	11:00 AM	9:47 AM	9:40 AM
Appl. Stop Time:	7:45 AM	8:45 AM	11:30 AM	11:15 AM	11:15 AM	9:50 AM	9:50 AM
Interval to Prev. Appl., Unit:		26 DAYS	1 DAYS	7 DAYS	7 DAYS	12 DAYS	2 DAYS
Application Method:	SPRAY	SPRAY	SPRAY	SPRAY	SPRAY	SPRAY	SPRAY
Application Timing:	PRE	2-4"WEEDS	6" GRW	7 DA "C"	10 GRW	7 DA "E"	POST
Application Placement:	BROSOI	BROFOL	BROFOL	BROFOL	BROFOL	BROFOL	BROFOL
Applied By:	Alyssa	Reeb	Reeb,Fisher	Reeb,Fisher	Reeb,Fisher	Dobbels	Reeb
Air Temperature, Unit:	56 F	59 F	71 F	71 F	71 F	74 F	78 F
% Relative Humidity:	90	73	55	55	55	77	78
Wind Velocity, Unit:	7 MPH	6 MPH	6 MPH	3 MPH	3 MPH	4 MPH	2 MPH
Wind Direction:	E	NE	S	NE	NE	ENE	NW
Dew Presence (Y/N):	N no	Y yes	N no	Y yes	Y yes	N no	Y yes
Soil Temperature, Unit:	60 F	69 F	71 F	72 F	72 F	71 F	70 F
Soil Moisture:	50FC	NORMAL	DRY	WET	WET	NORMAL	SLIWET
% Cloud Cover:	20	0	90	0	0	20	10
Next Moisture Occurred On:	May-15-2018	Jun-8-2018	Jun-8-2018	Jun-19-2018	Jun-19-2018	Jun-26-2018	Jul-2-2018
Time to Next Moisture, Unit:	4 DAY	2 DAY	1 DAY	5 DAY	5 DAY	4 HR	4 DAY
Moisture 1 Week after Appl.:	0.43 IN	1.1 IN	1.1 IN	1.44 IN	1.44 IN	1.29 IN	0.76 IN

Crop Stage At Each Application

	A		B		C		D		E		F		G	
Crop 1 Code, BBCH Scale:	GLXMA	BSOY	GLXMA	BSOY	GLXMA	BSOY	GLXMA	BSOY	GLXMA	BSOY	GLXMA	BSOY	GLXMA	BSOY
Stage Scale Used:	BBCH		BBCH		BBCH		BBCH		BBCH		BBCH		BBCH	
Stage Majority, Percent:	14	100	14	100	17	100	17	100	17	100	65	100	65	100
Height, Unit:	6	IN	7	IN	13	IN	13	IN	13	IN	21	IN	22	IN
Height Minimum, Maximum:	5	7	6.5	7.5	12	14	12	14	12	14	20	23	20	23

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Pest Stage At Each Application

	A	B	C	D	E	F	G
Pest 1 Code, Type, Scale:	SETFA W	SETFA W	SETFA W	SETFA W	SETFA W	SETFA W	SETFA W
Stage Majority, Percent:		13 100	21		23 100	14 100	
Height, Unit:		5 IN	9 IN		15 IN	5 IN	
Height Minimum, Maximum:		4 7	8 10		12 18		
Density, Unit:					256 PLA/m2		
Pest 2 Code, Type, Scale:	ECHCG W	ECHCG W	ECHCG W	ECHCG W	ECHCG W	ECHCG W	ECHCG W
Stage Majority, Percent:		13 100	23 100		23 100	23 100	22 100
Height, Unit:		5 IN	3.5 IN		15 IN	6 IN	15 IN
Height Minimum, Maximum:		4 7	3 4		12 18	1 8	10 20
Density, Unit:					1002 PLA/m2		
Pest 3 Code, Type, Scale:	AMBTR W	AMBTR W	AMBTR W	AMBTR W	AMBTR W	AMBTR W	AMBTR W
Stage Majority, Percent:		17 100			19 100		19 100
Height, Unit:		7 IN	9 IN		11 IN		19 IN
Height Minimum, Maximum:		5 11	5 10		10 12		18 20
Density, Unit:					3 PLA/m2		
Pest 4 Code, Type, Scale:	AMARE W	AMARE W	AMARE W	AMARE W	AMARE W	AMARE W	AMARE W
Density, Unit:					19 PLA/m2		
Pest 5 Code, Type, Scale:	CHEAL W	CHEAL W	CHEAL W	CHEAL W	CHEAL W	CHEAL W	CHEAL W
Stage Majority, Percent:		17 100	19 100				19 100
Height, Unit:		4 IN	6 IN				19 IN
Height Minimum, Maximum:		2 4	5 6				18 20
Density, Unit:					4 PLA/m2		
Pest 6 Code, Type, Scale:	ABUTH W	ABUTH W	ABUTH W	ABUTH W	ABUTH W	ABUTH W	ABUTH W
Stage Majority, Percent:			16 100				
Height, Unit:			3 IN				
Pest 7 Code, Type, Scale:	IPOHE W	IPOHE W	IPOHE W	IPOHE W	IPOHE W	IPOHE W	IPOHE W
Stage Majority, Percent:			13 100				
Height, Unit:			2 IN				
Height Minimum, Maximum:			2 4				
Pest 8 Code, Type, Scale:	HIBTR W	HIBTR W	HIBTR W	HIBTR W	HIBTR W	HIBTR W	HIBTR W
Stage Majority, Percent:			14 100				
Height, Unit:			3 IN				
Height Minimum, Maximum:			3 3.5				
Density, Unit:					3 PLA/m2		
Pest 9 Code, Type, Scale:	SIDSP W	SIDSP W	SIDSP W	SIDSP W	SIDSP W	SIDSP W	SIDSP W
Density, Unit:					5 PLA/m2		

Application Equipment

	A	B	C	D	E	F	G
Appl. Equipment:	6' BACKPACK	10' BACKPACK	10' BACKPACK	10' BACKPACK	10' BACKPACK	10' BACKPACK	10' BACKPACK
Equipment Type:	BACCAI	BACCAI	BACCAI	BACCAI	BACCAI	BACCAI	BACCAI
Operation Pressure, Unit:	44 PSI	44 PSI	50 PSI	44 PSI	44 PSI	44 PSI	44 PSI
Nozzle Type:	TTI	AIXR	AIXR	AIXR	AIXR	AIXR	AIXR
Nozzle Size:	11015	11015	11015	11015	11015	11015	11015
Nozzle Spacing, Unit:	18 IN	18 IN	18 IN	18 IN	18 IN	18 IN	18 IN
Nozzles/Row:	4	6	6	6	6	6	6
Boom Length, Unit:	6.67 FT	10 FT	10 FT	10 FT	10 FT	10 FT	10 FT
Boom Height, Unit:	20 IN	20 IN	20 IN	20 IN	20 IN	20 IN	20 IN
Ground Speed, Unit:	3 MPH	3 MPH	3 MPH	3 MPH	3 MPH	3 MPH	3 MPH
Carrier:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Spray Volume, Unit:	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac
Mix Size, Unit:	1 L	2 L	2 L	2 L	2 L	2 L	2 L
Propellant:	COMCO2	COMCO2	COMCO2	COMCO2	COMCO2	COMCO2	COMCO2

Date By Notes
 Jun-7-2018 Fisher,Reeb 4-7" AMARE in Check, Not in Plot

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Pest Type				
Pest Code				
Pest Scientific Name				
Pest Name				
Crop Code	GLXMA	GLXMA	GLXMA	GLXMA
BBCH Scale	BSOY	BSOY	BSOY	BSOY
Crop Scientific Name	Glycine max	Glycine max	Glycine max	Glycine max
Crop Name	Soybean	Soybean	Soybean	Soybean
Rating Date	Oct-10-2018	Oct-10-2018	Oct-10-2018	Oct-10-2018
Rating Type	WEIGHT	MOICON	WEITES	YIELD
Rating Unit	LBS	%	LB/BU	BU
Sample Size, Unit	1 PLOT			1 A
Number of Subsamples	1	1	1	1
Days After First/Last Applic.	152 104	152 104	152 104	152 104
Plant-Eval Interval	153 DP-1	153 DP-1	153 DP-1	153 DP-1
Days After Emergence	146 DE-1	146 DE-1	146 DE-1	146 DE-1
ARM Action Codes				TY1
Number of Decimals				1

Trt No.	Treatment Name	Other Rate	Other Rate Unit	Appl Code	33*	34*	35*	36*
1	Authority First	6.5 oz/a		A	23.55223 -	13.982 -	56.3405 -	90.9 -
1	Liberty	32 oz/a		C				
1	N-pak ams	1.5 qt/a		C				
1	Liberty	32 oz/a		D				
1	N-pak ams	1.5 qt/a		D				
2	Authority First	6.5 oz/a		A	22.17584 -	14.499 -	56.1157 -	85.1 -
2	Liberty	43 oz/a		E				
2	N-pak ams	1.5 qt/a		E				
2	Liberty	43 oz/a		F				
2	N-pak ams	1.5 qt/a		F				
3	Authority First	6.5 oz/a		A	20.50003 -	13.990 -	56.9008 -	79.1 -
3	Liberty	32 oz/a		C				
3	N-pak ams	1.5 qt/a		C				
4	Authority First	6.5 oz/a		A	21.46976 -	14.028 -	55.3630 -	82.7 -
4	Liberty	43 oz/a		E				
4	N-pak ams	1.5 qt/a		E				
5	Authority First	6.5 oz/a		A	20.88964 -	14.410 -	57.0024 -	80.4 -
5	Liberty	32 oz/a		C				
5	Prefix	2 pt/a		C				
5	N-pak ams	1.5 qt/a		C				
6	Authority First	6.5 oz/a		A	20.81101 -	13.953 -	54.6808 -	80.3 -
6	Liberty	32 oz/a		C				
6	Anthem Maxx	3.2 oz/a		C				
6	N-pak ams	1.5 qt/a		C				
7	Zidua Pro	6 oz/a		A	20.92178 -	14.215 -	54.7422 -	80.5 -
7	Liberty	32 oz/a		C				
7	Outlook	12 oz/a		C				
7	N-pak ams	1.5 qt/a		C				
8	Zidua Pro	6 oz/a		A	21.51267 -	14.530 -	55.5311 -	82.6 -
8	Liberty	32 oz/a		C				
8	N-pak ams	1.5 qt/a		C				
9	Authority XL	5 oz/a		A	20.82054 -	14.174 -	55.7289 -	80.1 -
9	Liberty	32 oz/a		C				
9	Warrant	48 oz/a		C				
9	N-pak ams	1.5 qt/a		C				

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.
 * Adjusted means

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Pest Type								
Pest Code								
Pest Scientific Name								
Pest Name								
Crop Code	GLXMA	GLXMA	GLXMA	GLXMA				
BBCH Scale	BSOY	BSOY	BSOY	BSOY				
Crop Scientific Name	Glycine max	Glycine max	Glycine max	Glycine max				
Crop Name	Soybean	Soybean	Soybean	Soybean				
Rating Date	Oct-10-2018	Oct-10-2018	Oct-10-2018	Oct-10-2018				
Rating Type	WEIGHT	MOICON	WEITES	YIELD				
Rating Unit	LBS	%	LB/BU	BU				
Sample Size, Unit	1 PLOT			1 A				
Number of Subsamples	1	1	1	1				
Days After First/Last Applic.	152 104	152 104	152 104	152 104				
Plant-Eval Interval	153 DP-1	153 DP-1	153 DP-1	153 DP-1				
Days After Emergence	146 DE-1	146 DE-1	146 DE-1	146 DE-1				
ARM Action Codes	TY1							
Number of Decimals	1							
Trt No.	Treatment Name	Other Rate	Other Rate	Appl Unit Code	33*	34*	35*	36*
10	Boundary	1.8 pt/a		A	20.67679 -	14.165 -	56.9064 -	79.6 -
10	Liberty	32 oz/a		C				
10	Prefix	2 pt/a		C				
10	N-pak ams	1.5 qt/a		C				
11	Authority MTZ	14 oz/a		A	21.21851 -	14.255 -	56.7831 -	81.5 -
11	Liberty	32 oz/a		C				
11	N-pak ams	1.5 qt/a		C				
11	Liberty	32 oz/a		D				
11	N-pak ams	1.5 qt/a		D				
12	Authority First	6.4 oz/a		A	21.34393 -	14.243 -	56.4378 -	82.3 -
12	Liberty	32 oz/a		C				
12	Cadet	0.6 oz/a		C				
12	N-pak ams	1.5 qt/a		C				
12	Liberty	32 oz/a		D				
12	N-pak ams	1.5 qt/a		D				
13	Authority XL	4 oz/a		A	21.96340 -	13.941 -	56.4662 -	84.8 -
13	Liberty	32 oz/a		C				
13	Anthem Maxx	3.2 oz/a		C				
13	N-pak ams	1.5 qt/a		C				
13	Liberty	32 oz/a		D				
13	N-pak ams	1.5 qt/a		D				
14	Moccasin MTZ	32 oz/a		A	21.43050 -	13.834 -	55.1535 -	82.8 -
14	Scepter	2.1 oz/a		A				
14	Interline	32 oz/a		B				
14	N-pak ams	1.5 qt/a		B				
14	Interline	32 oz/a		G				
14	Select Max	6 oz/a		G				
14	N-pak ams	1.5 qt/a		G				
14	NIS	4.8 oz/a		G				
15	Moccasin MTZ	40 oz/a		A	21.47396 -	14.425 -	53.5574 -	82.4 -
15	Scepter	2.1 oz/a		A				
15	Interline	32 oz/a		B				
15	N-pak ams	1.5 qt/a		B				
15	Interline	32 oz/a		G				
15	Select Max	6 oz/a		G				
15	N-pak ams	1.5 qt/a		G				
15	NIS	4.8 oz/a		G				

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Pest Type

Pest Code

Pest Scientific Name

Pest Name

Crop Code

GLXMA GLXMA GLXMA GLXMA

BBCH Scale

BSOY BSOY BSOY BSOY

Crop Scientific Name

Glycine max Glycine max Glycine max Glycine max

Crop Name

Soybean Soybean Soybean Soybean

Rating Date

Oct-10-2018 Oct-10-2018 Oct-10-2018 Oct-10-2018

Rating Type

WEIGHT MOICON WEITES YIELD

Rating Unit

LBS % LB/BU BU

Sample Size, Unit

1 PLOT 1 1 1 1 A

Number of Subsamples

1 1 1 1

Days After First/Last Applic.

152 104 152 104 152 104 152 104

Plant-Eval Interval

153 DP-1 153 DP-1 153 DP-1 153 DP-1

Days After Emergence

146 DE-1 146 DE-1 146 DE-1 146 DE-1

ARM Action Codes

Number of Decimals

TY1
1

Trt No.	Treatment Name	Other Rate	Other Rate	Appl Unit Code	33*	34*	35*	36*
16	Tripzin ZC	42 oz/a		A	19.44593 -	13.822 -	56.3980 -	75.1 -
16	Scepter	2.1 oz/a		A				
16	Interline	32 oz/a		B				
16	N-pak ams	1.5 qt/a		B				
16	Interline	32 oz/a		G				
16	Select Max	6 oz/a		G				
16	N-pak ams	1.5 qt/a		G				
16	NIS	4.8 oz/a		G				
	LSD P=.05				1.726139	0.6604	2.34121	6.59
	Standard Deviation				1.024314	0.3966	1.40402	3.91
	CV				4.85	2.8	2.51	4.81
	Levene's F				0.541	0.842	0.663	0.549
	Levene's Prob(F)				0.896	0.628	0.80	0.891
	Skewness				0.4755	1.2335*	-2.9735*	0.5164
	Kurtosis				0.584	3.6447*	11.1765*	0.7172
	Randomized Complete Block (RCB) AIC				167.0983	67.117	192.5583	297.5409
	Spatial AIC				SPa	SPb	SPc	SPa
					155.2532	62.4463	184.2345	283.793
	Analyzed as				CRD+SPa	CRD+SPb	CRD+SPc	CRD+SPa
	Replicate F				4.405	0.570	0.155	4.172
	Replicate Prob(F)				0.0235	0.5714	0.8574	0.0279
	Treatment F				1.733	0.738	1.365	1.775
	Treatment Prob(F)				0.1114	0.7290	0.2270	0.1018

Crop Code

GLXMA, BSOY, Glycine max, Soybean = US

Rating Type

WEIGHT = weight

MOICON = moisture content

WEITES = weight - test

YIELD = yield

Rating Unit

% = percent

BU = bushel

PLOT = total plot

A = acre

Plant-Eval Interval

153 DP-1 = 1 GLXMA May-10-2018

ARM Action Codes

TY1 = 3.872*[33]*(100-[34])/86.5

SPa = Cubic spatial trend

SPb = Nearest column neighbor

SPc = Linear spatial trend

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