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**Adjuvant effects on Atrazine and Glyphosate.** Dr. Howatt and Mettler. DKC40-77RIB corn was seeded near Fargo on May 29, 2019. Preemergence treatments were applied May 30 with 65.6°F, 65.1% relative humidity, 100% cloud-cover, 20 mph wind velocity at 160°, and dry soil surface at 58°F. Four inch treatments were applied to V3 corn, 10 inch tall redroot pigweed and common mallow, 4 inch tall common lambsquarters and Venice mallow, 8 inch tall wild buckwheat, and 5 leaf green foxtail on June 29 with 71.8°F, 65.6% relative humidity, 10% cloud-cover, 7 to 8 mph wind velocity at 250°, and moist soil at 64°F. All treatments were applied with a backpack sprayer delivering 8.5 gpa at 40 psi through 11001 TT nozzles. The experiment was a randomized complete block design with four replicates.

Treatment	Rate (oz ai/A)		7/3 Wibw	7/3 Coma	7/3 Vema	7/12 Colq	7/12 Wibw	7/12 Coma
Untreated	0		0	0	0	0	0	0
Acet&Mest&Clpy/ Handweeded Check	39.5/0	PRE	98	98	97	99	98	98
Mest+Atra 4L+Glyt-ipa	1.5+8+12	4"	86	82	88	91	96	94
Mest+Atra 4L+Glyt-ipa+TLD+AMS	1.5+8+12+0.5%+11	4"	84	80	86	92	97	97
Mest+Atra 4L+Glyt-ipa+TLD+AMS+MOL	1.5+8+12+0.5%+11+4	4"	83	79	84	89	97	98
Mest+Atra 4L+Glyt-ipa+TLD+AMS+KEY	1.5+8+12+0.5%+11+57 g/A	4"	85	81	88	91	96	97
Mest+Atra 4L+Glyt-ipa+TLD+AMS+BAG	1.5+8+12+0.5%+11+3	4"	81	79	87	89	97	97
Mest+Atra 4L+Glyt-ipa+TLD+AMS+SAL	1.5+8+12+0.5%+11+18	4"	84	83	89	92	96	96
Mest+Atra 4L+Glyt-ipa+TLD+AMS+MOL+KEY	1.5+8+12+0.5%+11+4+57g/A	4"	81	80	85	87	97	96
CV			3.74	3.7	3.67	2.52	1.41	1.62
LSD			4.14	3.98	4.20	2.99	1.78	2.04

Treatment	Rate (oz ai/A)		7/12 Vema	7/12 Colq	7/20 Wibw	7/20 Coma	7/20 Vema	7/20 Colq
Untreated	0		0	0	0	0	0	0
Acet&Mest&Clpy/ Handweeded Check	39.5/0	PRE	94	98	99	99	95	99
Mest+Atra 4L+Glyt-ipa	1.5+8+12	4"	93	97	95	99	96	99
Mest+Atra 4L+Glyt-ipa+TLD+AMS	1.5+8+12+0.5%+11	4"	93	95	98	99	97	99
Mest+Atra 4L+Glyt-ipa+TLD+AMS+MOL	1.5+8+12+0.5%+11+4	4"	96	98	98	99	94	98
Mest+Atra 4L+Glyt-ipa+TLD+AMS+KEY	1.5+8+12+0.5%+11+57 g/A	4"	95	97	96	99	97	98
Mest+Atra 4L+Glyt-ipa+TLD+AMS+BAG	1.5+8+12+0.5%+11+3	4"	93	97	92	99	96	97
Mest+Atra 4L+Glyt-ipa+TLD+AMS+SAL	1.5+8+12+0.5%+11+18	4"	92	97	95	99	96	95
Mest+Atra 4L+Glyt-ipa+TLD+AMS+MOL+KEY	1.5+8+12+0.5%+11+4+57g/A	4"	95	97	96	99	96	95
CV			2.64	1.32	1.51	0.0	1.78	1.23
LSD			3.22	1.67	1.89	.	2.23	1.56

**Adjuvant effects on Dicamba and glyphosate.** Dr. Howatt and Mettler. DKC40-77RIB corn was seeded near Fargo on May 29, 2019. Preemergence treatments were applied May 30 with 64.5°F, 65% relative humidity, 100% cloud-cover, 20 mph wind velocity at 160°, and dry soil at 58°F. Post treatments were applied to V3 corn, 5 to 16 inch redroot pigweed, 5 to 13 inch common lambsquarters, 12 inch common mallow and 8 inch wild buckwheat on June 29 with 72°F, 65% relative humidity, 10% cloud-cover, 8 to 9 mph wind velocity at 270°, and moist soil at 64°F. All treatments were applied with a backpack sprayer delivering 8.5 gpa at 40 psi through 11001 TT nozzles to a 7 foot wide area the length of 10 by 40 foot plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate (oz ai/A)	7/3	7/3	7/3	7/3	7/3	7/12	7/12
		Wibw	Coma	Vema	Colq	Rrpw	Wibw	Coma
Untreated	0	0	0	0	0	0	0	0
Acet&Mest&Clpy/ Handweeded	39.5	99	98	99	99	99	99	97
Dica&Difl+Glyt-ipa	3+12	74	74	80	77	71	95	96
Dica&Difl+Glyt-ipa+SXP+AMS	3+12+10+11	80	83	86	86	76	98	99
Dica&Difl+Glyt-ipa+SXP+AMS+MOL	3+12+10+11+4	80	80	84	86	77	97	98
Dica&Difl+Glyt-ipa+SXP+AMS+KEY	3+12+10+11+57 g/A	80	79	80	80	75	97	98
Dica&Difl+Glyt-ipa+SXP+AMS+BAG	3+12+10+11+3	76	77	77	84	79	97	96
Dica&Difl+Glyt-ipa+SXP+AMS+SAL	3+12+10+11+4+18	79	79	82	82	81	97	97
Dica&Difl+Glyt-ipa+SXP+AMS+MOL+KEY	3+12+10+11+4+57 g/A	80	81	84	85	75	96	98
CV		3.58	4.16	4.09	4.65	5.71	1.15	1.38
LSD		3.76	4.39	4.46	5.12	5.87	1.45	1.75

g/A=gram/Acre

Treatment	Rate (oz ai/A)	7/12	7/12	7/12	7/20	7/20	7/20	7/20	7/20
		Vema	Colq	Rrpw	Wibw	Coma	Vema	Colq	Rrpw
Untreated	0	0	0	0	0	0	0	0	0
Acet&Mest&Clpy/ Handweeded	39.5	97	99	97	98	99	95	99	97
Dica&Difl+Glyt-ipa	3+12	97	91	84	97	99	97	96	89
Dica&Difl+Glyt-ipa+SXP+AMS	3+12+10+11	98	95	87	99	99	96	97	92
Dica&Difl+Glyt-ipa+SXP+AMS+MOL	3+12+10+11+4	97	96	94	97	99	97	93	92
Dica&Difl+Glyt-ipa+SXP+AMS+KEY	3+12+10+11+57 g/A	97	95	87	99	99	97	89	85
Dica&Difl+Glyt-ipa+SXP+AMS+BAG	3+12+10+11+3	97	95	87	99	99	98	92	82
Dica&Difl+Glyt-ipa+SXP+AMS+SAL	3+12+10+11+4+18	96	93	81	98	99	95	87	80
Dica&Difl+Glyt-ipa+SXP+AMS+MOL+KEY	3+12+10+11+4+57 g/A	97	90	83	98	99	96	85	81
CV		1.62	1.91	3.39	1.15	0.0	1.19	2.9	3.12
LSD		2.04	2.33	3.85	1.47	.	1.50	3.47	3.54

g/A=gram/Acre

# North Dakota State University

Trial ID: 19S-PROSPER-CORN-01	<b>Weed Management Programs in Corn</b>	Location: PROSPER
Protocol ID: 19S-PROSPER-CORN-01	Investigator (Creator): Dr. Joe Ikley	Trial Year: 2019
Project ID:	Study Director: Joe Ikley	
	Sponsor Contact: Syngenta, AMVAC, BASF	

## General Trial Information

**Study Director:** Joe Ikley  
**Investigator:** Dr. Joe Ikley

**Discipline:** H herbicide  
**Trial Status:** E established

**Trial Status Date:** Jun-7-2019

**Last Changed By:** Dr. Joe Ikley

**ARM Trial Created On:** May-9-2019

**Protocol Revision Date:** May-9-2019

**Conducted Under GLP:** No

**Conducted Under GEP:** No

## Contacts

**Role:** STYDIR study director  
**Study Director:** Joe Ikley

**Role:** INVEST investigator  
**Investigator:** Dr. Joe Ikley

**Role:** SPONSR sponsor  
**Sponsor:** Syngenta, AMVAC, BASF

## Site and Design

**Treated Plot Width:** 6.67 FT

**Treated Plot Length:** 30 FT

**Treated Plot Area:** 200.1 FT<sup>2</sup> **Treatments:** 16

**Replications:** 4

**Study Design:** RAOBL Randomized Complete Block (RCB)

## Soil Description

**Description Name:** Prosper

**% Sand:** 24.7      **% OM:** 4      **Texture:** SIL      silt loam  
**% Silt:** 53.3      **pH:** 7.3      **Soil Name:** Kindred-Bearden Silty Clay Loam  
**% Clay:** 22      **CEC:** 18.5

## Application Description

	A	B	C
<b>Application Date</b>	May-17-2019	Jun-13-2019	Jun-18-2019
<b>Appl. Start Time</b>	9:00 AM	8:20 AM	9:40 AM
<b>Appl. Stop Time</b>	9:30 AM	8:40 AM	10:20 AM
<b>Interval to Prev. Appl.</b>		27 DAYS	5 DAYS
<b>Application Method</b>	SPRAY	SPRAY	SPRAY
<b>Application Timing</b>	PREEM		
<b>Application Placement</b>	BROADC	BROADC	BROADC
<b>Applied By</b>	Ikley, J.	Haugrud, N.	Haugrud, N.
<b>Appl. Entry Date</b>	Jun-7-2019	Jun-14-2019	Jun-18-2019
<b>Air Temperature Start, Stop</b>	49    51    F	62    66    F	67    72    F
<b>% Relative Humidity Start, Stop</b>	55    51	46    39	71    63
<b>Wind Velocity+Dir. Start</b>	8    MPH    NNE	8    MPH    S	3.7    MPH    NNE
<b>Wind Velocity+Dir. Stop</b>	8    MPH    NNE	8    MPH    S	4.1    MPH    NNE
<b>Wind Velocity+Dir. Max</b>	10    MPH    NNE		
<b>Wet Leaves (Y/N)</b>	N no	N no	Y yes
<b>Soil Temperature</b>	47    F	58    F	65    F
<b>Soil Moisture</b>	GOOD	DRY	DRY
<b>Soil Surface Condition</b>	CLOTRA		
<b>% Cloud Cover</b>	0	40	70

# North Dakota State University

Trial ID: 19S-PROSPER-CORN-01	<b>Weed Management Programs in Corn</b>	Trial Year: 2019
Protocol ID: 19S-PROSPER-CORN-01	Location: PROSPER	
Project ID:	Investigator (Creator): Dr. Joe Ikley	
	Study Director: Joe Ikley	
	Sponsor Contact: Syngenta, AMVAC, BASF	

**Application Equipment**

	A	B	C
<b>Appl. Equipment</b>	Mjолnir	Narsil	Narsil
<b>Equipment Type</b>	BACCAI	BACCAI	BACCAI
<b>Operation Pressure</b>	28 PSI	28 PSI	28 PSI
<b>Nozzle Type</b>	TTI	XR	XR
<b>Nozzle Size</b>	11002	8002	8002
<b>Nozzle Spacing</b>	20 IN	20 IN	20 IN
<b>Boom Length</b>	6.67 FT	6.67 FT	6.67 FT
<b>Boom Height</b>	18 IN	18 IN	18 IN
<b>Ground Speed</b>	3 MPH	3 MPH	3 MPH
<b>Carrier</b>	WATER	WATER	WATER
<b>Application Amount</b>	15 GAL/AC	15 GAL/AC	15 GAL/AC
<b>Mix Size</b>	1119 mL	1119 mL	1119 mL
<b>Propellant</b>	COMCO2	COMCO2	COMCO2

Context	Date	By	Notes
STATUS	May-9-2019	Dr. Joe Ikley	Automatically added by ARM: Trial Status updated to 'S' during trial creation.
STATUS	Jun-7-2019	Dr. Joe Ikley	Automatically added by ARM: Trial Status updated to 'E' when Application Date entered.

Pest Type		W Weed	W Weed	W Weed			
Pest Code		SETPU	HELAN	CHEAL			
Pest Scientific Name		Setaria helvola	Helianthus annuus	Chenopodium album			
Pest Name		yellow foxtail	Common sunflower	common lambsquarters			
Rating Date	Jun-13-2019	Jun-13-2019	Jun-13-2019	Jun-13-2019	Jun-25-2019		
Rating Type	PHYTO	CONTRO	CONTRO	CONTRO	PHYTO		
Rating Unit	%	%	%	%	%		
Number of Subsamples	1	1	1	1	1		
Data Entry Date	Jul-29-2019	Jul-29-2019	Jul-29-2019	Jul-29-2019	Jul-31-2019		
Days After First/Last Applic.	27 27	27 27	27 27	27 27	39 7		
Plant-Eval Interval	29 DP-1	29 DP-1	29 DP-1	29 DP-1	41 DP-1		
Days After Emergence	11 DE-1	11 DE-1	11 DE-1	11 DE-1	23 DE-1		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	1*	2*	3*	4*	5*
1 Untreated Check			0.0 -	0.0 b	0.0 c	0.0 c	0.0 -
2 ACURON	2.5 qt/a	A	0.0 -	90.0 a	88.8 ab	100.0 a	0.0 -
3 ACURON FLEXI	2 qt/a	A	1.3 -	90.0 a	90.0 ab	100.0 a	0.0 -
4 ACURON	1.25 qt/a	A	0.0 -	80.0 a	92.5 a	100.0 a	0.0 -
ACURON	1.25 qt/a	C					
ROUNDUP POWERMAX	1 qt/a	C					
N-PAK AMS	2.5 % v/v	C					
5 ACURON FLEXI	1 qt/a	A	1.3 -	73.8 a	83.8 ab	100.0 a	0.0 -
ACURON FLEXI	1 qt/a	C					
ROUNDUP POWERMAX	1 qt/a	C					
N-PAK AMS	2.5 % v/v	C					
6 ACURON	1.25 qt/a	A	0.0 -	70.0 a	86.3 ab	97.5 a	0.0 -
HALEX GT	3.6 pt/a	C					
AATREX	0.5 pt/a	C					
ACTIVATOR 90 - NIS	0.25 % v/v	C					
N-PAK AMS	2.5 % v/v	C					
7 ACURON	2.5 qt/a	B	0.0 -	0.0 b	0.0 c	0.0 c	0.0 -
ROUNDUP POWERMAX	1 qt/a	B					
N-PAK AMS	2.5 % v/v	B					

# North Dakota State University

## Weed Management Programs in Corn

Trial ID: 19S-PROSPER-CORN-01      Location: PROSPER      Trial Year: 2019  
 Protocol ID: 19S-PROSPER-CORN-01      Investigator (Creator): Dr. Joe Ikley  
 Project ID:      Study Director: Joe Ikley  
 Sponsor Contact: Syngenta, AMVAC, BASF

Pest Type		W Weed	W Weed	W Weed			
Pest Code		SETPU	HELAN	CHEAL			
Pest Scientific Name		Setaria helvola	Helianthus annuus	Chenopodium album			
Pest Name		yellow foxtail	Common sunflower	common lambsquarters			
Rating Date	Jun-13-2019	Jun-13-2019	Jun-13-2019	Jun-13-2019	Jun-25-2019		
Rating Type	PHYTO	CONTRO	CONTRO	CONTRO	PHYTO		
Rating Unit	%	%	%	%	%		
Number of Subsamples	1	1	1	1	1		
Data Entry Date	Jul-29-2019	Jul-29-2019	Jul-29-2019	Jul-29-2019	Jul-31-2019		
Days After First/Last Applic.	27 27	27 27	27 27	27 27	39 7		
Plant-Eval Interval	29 DP-1	29 DP-1	29 DP-1	29 DP-1	41 DP-1		
Days After Emergence	11 DE-1	11 DE-1	11 DE-1	11 DE-1	23 DE-1		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	1*	2*	3*	4*	5*
8 ARMEZON PRO	18 fl oz/a B		0.0 -	0.0 b	0.0 c	0.0 c	0.0 -
AATREX	12 fl oz/a B						
ROUNDUP POWERMAX	1 qt/a B						
N-PAK AMS	2.5 % v/v B						
9 VERDICT	10 fl oz/a A		1.3 -	72.5 a	91.3 a	95.0 a	0.0 -
ARMEZON PRO	18 fl oz/a C						
AATREX	12 fl oz/a C						
ROUNDUP POWERMAX	1 qt/a C						
N-PAK AMS	2.5 % v/v C						
10 VERDICT	15 fl oz/a A		1.3 -	82.5 a	88.2 ab	97.5 a	0.0 -
STATUS	5 oz/a C						
ROUNDUP POWERMAX	1 qt/a C						
N-PAK AMS	2.5 % v/v C						
11 HARNESS XTRA	3.2 pt/a A		2.5 -	85.0 a	67.5 b	97.5 a	0.0 -
IMPACTZ	10.7 fl oz/a C						
MSO ULTRA	1 % v/v C						
N-PAK AMS	2.5 % v/v C						
12 HARNESS XTRA	3.2 pt/a A		1.3 -	85.0 a	70.0 ab	90.0 a	0.0 -
IMPACTZ	8 fl oz/a C						
LIBERTY 280 SL	22 fl oz/a C						
MSO ULTRA	0.5 % v/v C						
N-PAK AMS	2.5 % v/v C						
13 HARNESS	1.75 pt/a B		0.0 -	0.0 b	0.0 c	0.0 c	0.0 -
IMPACT	1 fl oz/a B						
AATREX	1 pt/a B						
MSO ULTRA	0.5 % v/v B						
N-PAK AMS	2.5 % v/v B						
14 HARNESS	1.75 pt/a B		0.0 -	0.0 b	0.0 c	0.0 c	0.0 -
IMPACT	0.75 fl oz/a B						
ROUNDUP POWERMAX	32 fl oz/a B						
AATREX	1 pt/a B						
MSO ULTRA	0.25 % v/v B						
N-PAK AMS	2.5 % v/v B						
15 HELMET	1.67 pt/a A		0.0 -	82.5 a	0.0 c	42.5 b	0.0 -
HAI TRADENAME	3.42 fl oz/a C						
MSO ULTRA	1 % v/v C						
28% UAN	2.5 % v/v C						
16 HELMET	1.67 pt/a A		1.3 -	85.0 a	0.0 c	50.0 b	0.0 -
HAI TRADENAME	3.42 fl oz/a C						
AATREX	1 pt/a C						
MSO ULTRA	1 % v/v C						
28% UAN	2.5 % v/v C						
LSD P=.05			2.46	13.59	14.64	23.58	.
Standard Deviation			1.73	9.54	10.27	16.56	0.00
CV			276.49	17.03	21.94	27.31	0.0
Levene's F			1.067	2.104	1.065	28.169	0.00
Levene's Prob(F)			0.41	0.026*	0.412	0.001*	.
Skewness			2.3226*	-0.6442*	-0.0851	-0.4939	.
Kurtosis			3.5029*	-1.4369*	-1.9664*	-1.7576*	.
Replicate F			0.349	1.092	2.314	3.480	0.000
Replicate Prob(F)			0.7901	0.3624	0.0890	0.0234	1.0000
Treatment F			0.837	68.205	71.549	30.292	0.000
Treatment Prob(F)			0.6333	0.0001	0.0001	0.0001	1.0000

# North Dakota State University

## Weed Management Programs in Corn

Trial ID: 19S-PROSPER-CORN-01	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-CORN-01	Investigator (Creator): Dr. Joe Ikley	
Project ID:	Study Director: Joe Ikley	
	Sponsor Contact: Syngenta, AMVAC, BASF	

Pest Type	W Weed	W Weed	W Weed	W Weed
Pest Code	SETPU	HELAN	CHEAL	XANST
Pest Scientific Name	Setaria helvola	Helianthus annuus	Chenopodium album	Xanthium strumarium
Pest Name	yellow foxtail	Common sunflower	common lambsquarters	Common cocklebur
Rating Date	Jun-25-2019	Jun-25-2019	Jun-25-2019	Jun-25-2019
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019
Days After First/Last Applic.	39 7	39 7	39 7	39 7
Plant-Eval Interval	41 DP-1	41 DP-1	41 DP-1	41 DP-1
Days After Emergence	23 DE-1	23 DE-1	23 DE-1	23 DE-1
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code	6*	7*
1 Untreated Check			0.0 c	0.0 d
2 ACURON	2.5 qt/a A		77.5 b	88.8 b
3 ACURON FLEXI	2 qt/a A		78.8 b	87.5 b
4 ACURON	1.25 qt/a A		97.5 a	100.0 a
ACURON	1.25 qt/a C			
ROUNDUP POWERMAX	1 qt/a C			
N-PAK AMS	2.5 % v/v C			
5 ACURON FLEXI	1 qt/a A		96.3 a	100.0 a
ACURON FLEXI	1 qt/a C			
ROUNDUP POWERMAX	1 qt/a C			
N-PAK AMS	2.5 % v/v C			
6 ACURON	1.25 qt/a A		95.0 a	100.0 a
HALEX GT	3.6 pt/a C			
AATREX	0.5 pt/a C			
ACTIVATOR 90 - NIS	0.25 % v/v C			
N-PAK AMS	2.5 % v/v C			
7 ACURON	2.5 qt/a B		97.5 a	100.0 a
ROUNDUP POWERMAX	1 qt/a B			
N-PAK AMS	2.5 % v/v B			
				8*
				9*
				0.0 c
				0.0 d
				100.0 a
				73.8 b
				100.0 a
				85.0 ab
				100.0 a
				97.5 a
				100.0 a
				100.0 a
				100.0 a
				100.0 a
				100.0 a
				97.5 a

# North Dakota State University

## Weed Management Programs in Corn

Trial ID: 19S-PROSPER-CORN-01      Location: PROSPER      Trial Year: 2019  
 Protocol ID: 19S-PROSPER-CORN-01      Investigator (Creator): Dr. Joe Ikley  
 Project ID:      Study Director: Joe Ikley  
 Sponsor Contact: Syngenta, AMVAC, BASF

Pest Type	W Weed	W Weed	W Weed	W Weed
Pest Code	SETPU	HELAN	CHEAL	XANST
Pest Scientific Name	Setaria helvola	Helianthus annuus	Chenopodium album	Xanthium strumarium
Pest Name	yellow foxtail	Common sunflower	common lambsquarters	Common cocklebur
Rating Date	Jun-25-2019	Jun-25-2019	Jun-25-2019	Jun-25-2019
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019
Days After First/Last Applic.	39 7	39 7	39 7	39 7
Plant-Eval Interval	41 DP-1	41 DP-1	41 DP-1	41 DP-1
Days After Emergence	23 DE-1	23 DE-1	23 DE-1	23 DE-1
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code	6*	7*
8 ARMEZON PRO	18 fl oz/a B		96.3 a	100.0 a
AATREX	12 fl oz/a B			
ROUNDUP POWERMAX	1 qt/a B			
N-PAK AMS	2.5 % v/v B			
9 VERDICT	10 fl oz/a A		98.8 a	100.0 a
ARMEZON PRO	18 fl oz/a C			
AATREX	12 fl oz/a C			
ROUNDUP POWERMAX	1 qt/a C			
N-PAK AMS	2.5 % v/v C			
10 VERDICT	15 fl oz/a A		98.8 a	100.0 a
STATUS	5 oz/a C			
ROUNDUP POWERMAX	1 qt/a C			
N-PAK AMS	2.5 % v/v C			
11 HARNESS XTRA	3.2 pt/a A		100.0 a	97.5 a
IMPACTZ	10.7 fl oz/a C			
MSO ULTRA	1 % v/v C			
N-PAK AMS	2.5 % v/v C			
12 HARNESS XTRA	3.2 pt/a A		100.0 a	100.0 a
IMPACTZ	8 fl oz/a C			
LIBERTY 280 SL	22 fl oz/a C			
MSO ULTRA	0.5 % v/v C			
N-PAK AMS	2.5 % v/v C			
13 HARNESS	1.75 pt/a B		97.5 a	98.8 a
IMPACT	1 fl oz/a B			
AATREX	1 pt/a B			
MSO ULTRA	0.5 % v/v B			
N-PAK AMS	2.5 % v/v B			
14 HARNESS	1.75 pt/a B		97.5 a	97.5 a
IMPACT	0.75 fl oz/a B			
ROUNDUP POWERMAX	32 fl oz/a B			
AATREX	1 pt/a B			
MSO ULTRA	0.25 % v/v B			
N-PAK AMS	2.5 % v/v B			
15 HELMET	1.67 pt/a A		81.3 b	22.5 c
HAI TRADENAME	3.42 fl oz/a C			
MSO ULTRA	1 % v/v C			
28% UAN	2.5 % v/v C			
16 HELMET	1.67 pt/a A		97.5 a	86.3 b
HAI TRADENAME	3.42 fl oz/a C			
AATREX	1 pt/a C			
MSO ULTRA	1 % v/v C			
28% UAN	2.5 % v/v C			
LSD P=.05	8.68	4.53	9.03	13.94
Standard Deviation	6.10	3.18	6.34	9.78
CV	6.92	3.69	6.98	11.65
Levene's F	2.655	2.342	3.933	2.397
Levene's Prob(F)	0.005*	0.013*	0.001*	0.011*
Skewness	-2.965*	-2.268*	-2.8916*	-2.2192*
Kurtosis	8.194*	3.6722*	7.1638*	3.7597*
Replicate F	3.505	1.687	1.387	1.342
Replicate Prob(F)	0.0228	0.1833	0.2589	0.2726
Treatment F	65.607	354.209	69.508	32.077
Treatment Prob(F)	0.0001	0.0001	0.0001	0.0001



# North Dakota State University

## Weed Management Programs in Corn

Trial ID: 19S-PROSPER-CORN-01	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-CORN-01	Investigator (Creator): Dr. Joe Ikley	
Project ID:	Study Director: Joe Ikley	
	Sponsor Contact: Syngenta, AMVAC, BASF	

	W Weed	W Weed	W Weed	W Weed
Pest Type	AMBEL	SETPU	HELAN	CHEAL
Pest Code	Ambrosia artemisiifolia	Setaria helvola	Helianthus annuus	Chenopodium album
Pest Scientific Name	Common ragweed	yellow foxtail	Common sunflower	common lambsquarters
Pest Name				
Rating Date	Jun-25-2019	Jul-2-2019	Jul-2-2019	Jul-2-2019
Rating Type	CONTRO	PHYTO	CONTRO	CONTRO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019
Days After First/Last Applic.	39 7	46 14	46 14	46 14
Plant-Eval Interval	41 DP-1	48 DP-1	48 DP-1	48 DP-1
Days After Emergence	23 DE-1	30 DE-1	30 DE-1	30 DE-1
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code	10*	11*
1 Untreated Check			0.0 c	0.0 -
2 ACURON	2.5 qt/a A		97.5 a	0.0 -
3 ACURON FLEXI	2 qt/a A		95.0 a	1.3 -
4 ACURON	1.25 qt/a A		100.0 a	0.0 -
ACURON	1.25 qt/a C			
ROUNDUP POWERMAX	1 qt/a C			
N-PAK AMS	2.5 % v/v C			
5 ACURON FLEXI	1 qt/a A		97.5 a	0.0 -
ACURON FLEXI	1 qt/a C			
ROUNDUP POWERMAX	1 qt/a C			
N-PAK AMS	2.5 % v/v C			
6 ACURON	1.25 qt/a A		100.0 a	0.0 -
HALEX GT	3.6 pt/a C			
AATREX	0.5 pt/a C			
ACTIVATOR 90 - NIS	0.25 % v/v C			
N-PAK AMS	2.5 % v/v C			
7 ACURON	2.5 qt/a B		100.0 a	0.8 -
ROUNDUP POWERMAX	1 qt/a B			
N-PAK AMS	2.5 % v/v B			
				12*
				13*
				14*
				0.0 b
				71.3 b
				75.0 b
				100.0 a
				100.0 a
				100.0 a
				100.0 a
				98.8 a
				100.0 a
				98.8 a
				100.0 a
				97.5 a
				100.0 a
				100.0 a

# North Dakota State University

Trial ID: 19S-PROSPER-CORN-01	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-CORN-01	Investigator (Creator): Dr. Joe Ikley	
Project ID:	Study Director: Joe Ikley	
Sponsor Contact: Syngenta, AMVAC, BASF		

Pest Type	W Weed	W Weed	W Weed	W Weed
Pest Code	AMBEL	SETPU	HELAN	CHEAL
Pest Scientific Name	Ambrosia artemisiifolia	Setaria helvola	Helianthus annuus	Chenopodium album
Pest Name	Common ragweed	yellow foxtail	Common sunflower	common lambsquarters
Rating Date	Jun-25-2019	Jul-2-2019	Jul-2-2019	Jul-2-2019
Rating Type	CONTRO	PHYTO	CONTRO	CONTRO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019
Days After First/Last Applic.	39 7	46 14	46 14	46 14
Plant-Eval Interval	41 DP-1	48 DP-1	48 DP-1	48 DP-1
Days After Emergence	23 DE-1	30 DE-1	30 DE-1	30 DE-1
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code	10*	11*
8 ARMEZON PRO	18 fl oz/a B		98.8 a	1.3 -
AATREX	12 fl oz/a B			
ROUNDUP POWERMAX	1 qt/a B			
N-PAK AMS	2.5 % v/v B			
9 VERDICT	10 fl oz/a A		100.0 a	0.0 -
ARMEZON PRO	18 fl oz/a C			
AATREX	12 fl oz/a C			
ROUNDUP POWERMAX	1 qt/a C			
N-PAK AMS	2.5 % v/v C			
10 VERDICT	15 fl oz/a A		100.0 a	0.8 -
STATUS	5 oz/a C			
ROUNDUP POWERMAX	1 qt/a C			
N-PAK AMS	2.5 % v/v C			
11 HARNESS XTRA	3.2 pt/a A		98.8 a	1.3 -
IMPACTZ	10.7 fl oz/a C			
MSO ULTRA	1 % v/v C			
N-PAK AMS	2.5 % v/v C			
12 HARNESS XTRA	3.2 pt/a A		100.0 a	0.0 -
IMPACTZ	8 fl oz/a C			
LIBERTY 280 SL	22 fl oz/a C			
MSO ULTRA	0.5 % v/v C			
N-PAK AMS	2.5 % v/v C			
13 HARNESS	1.75 pt/a B		100.0 a	0.0 -
IMPACT	1 fl oz/a B			
AATREX	1 pt/a B			
MSO ULTRA	0.5 % v/v B			
N-PAK AMS	2.5 % v/v B			
14 HARNESS	1.75 pt/a B		100.0 a	0.0 -
IMPACT	0.75 fl oz/a B			
ROUNDUP POWERMAX	32 fl oz/a B			
AATREX	1 pt/a B			
MSO ULTRA	0.25 % v/v B			
N-PAK AMS	2.5 % v/v B			
15 HELMET	1.67 pt/a A		37.5 b	2.5 -
HAI TRADENAME	3.42 fl oz/a C			
MSO ULTRA	1 % v/v C			
28% UAN	2.5 % v/v C			
16 HELMET	1.67 pt/a A		92.5 a	1.5 -
HAI TRADENAME	3.42 fl oz/a C			
AATREX	1 pt/a C			
MSO ULTRA	1 % v/v C			
28% UAN	2.5 % v/v C			
LSD P=.05	9.15	2.50	6.84	6.56
Standard Deviation	6.43	1.76	4.81	4.61
CV	7.25	304.09	5.35	5.18
Levene's F	3.92	0.793	4.029	3.186
Levene's Prob(F)	0.001*	0.679	0.001*	0.001*
Skewness	-2.5699*	3.583*	-2.9604*	-3.288*
Kurtosis	5.1812*	14.5292*	8.0215*	10.0416*
Replicate F	1.451	1.582	1.820	1.890
Replicate Prob(F)	0.2407	0.2068	0.1570	0.1448
Treatment F	77.003	0.774	113.278	110.607
Treatment Prob(F)	0.0001	0.6983	0.0001	0.0001

# North Dakota State University

## Weed Management Programs in Corn

Trial ID: 19S-PROSPER-CORN-01	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-CORN-01	Investigator (Creator): Dr. Joe Ikley	
Project ID:	Study Director: Joe Ikley	
	Sponsor Contact: Syngenta, AMVAC, BASF	

Pest Type	W Weed	W Weed	W Weed	W Weed		
Pest Code	XANST	AMBEL	SETPU	HELAN		
Pest Scientific Name	Xanthium strumarium	Ambrosia artemisiifolia	Setaria helvola	Helianthus annuus		
Pest Name	Common cocklebur	Common ragweed	yellow foxtail	Common sunflower		
Rating Date	Jul-2-2019	Jul-2-2019	Jul-16-2019	Jul-16-2019		
Rating Type	CONTRO	CONTRO	PHYTO	CONTRO		
Rating Unit	%	%	%	%		
Number of Subsamples	1	1	1	1		
Data Entry Date	Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019		
Days After First/Last Applic.	46 14	46 14	60 28	60 28		
Plant-Eval Interval	48 DP-1	48 DP-1	62 DP-1	62 DP-1		
Days After Emergence	30 DE-1	30 DE-1	44 DE-1	44 DE-1		
Trt Treatment						
No. Name	Rate Unit Code	15*	16*	17*	18*	19*
1 Untreated Check		0.0 c	0.0 b	0.0 -	0.0 c	0.0 c
2 ACURON	2.5 qt/a A	81.3 b	97.5 a	0.0 -	66.3 b	77.5 b
3 ACURON FLEXI	2 qt/a A	82.5 b	97.5 a	0.0 -	67.5 b	82.5 b
4 ACURON	1.25 qt/a A	92.5 a	100.0 a	0.0 -	100.0 a	98.8 a
ACURON	1.25 qt/a C					
ROUNDUP POWERMAX	1 qt/a C					
N-PAK AMS	2.5 % v/v C					
5 ACURON FLEXI	1 qt/a A	86.3 ab	100.0 a	0.0 -	99.8 a	99.5 a
ACURON FLEXI	1 qt/a C					
ROUNDUP POWERMAX	1 qt/a C					
N-PAK AMS	2.5 % v/v C					
6 ACURON	1.25 qt/a A	92.0 a	100.0 a	0.0 -	99.8 a	100.0 a
HALEX GT	3.6 pt/a C					
AATREX	0.5 pt/a C					
ACTIVATOR 90 - NIS	0.25 % v/v C					
N-PAK AMS	2.5 % v/v C					
7 ACURON	2.5 qt/a B	92.5 a	100.0 a	0.0 -	97.0 a	99.5 a
ROUNDUP POWERMAX	1 qt/a B					
N-PAK AMS	2.5 % v/v B					

# North Dakota State University

Trial ID: 19S-PROSPER-CORN-01	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-CORN-01	Investigator (Creator): Dr. Joe Ikley	
Project ID:	Study Director: Joe Ikley	
Sponsor Contact: Syngenta, AMVAC, BASF		

Pest Type	W Weed	W Weed	W Weed	W Weed
Pest Code	XANST	AMBEL	SETPU	HELAN
Pest Scientific Name	Xanthium strumarium	Ambrosia artemisiifolia	Setaria helvola	Helianthus annuus
Pest Name	Common cocklebur	Common ragweed	yellow foxtail	Common sunflower
Rating Date	Jul-2-2019	Jul-2-2019	Jul-16-2019	Jul-16-2019
Rating Type	CONTRO	CONTRO	PHYTO	CONTRO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019
Days After First/Last Applic.	46 14	46 14	60 28	60 28
Plant-Eval Interval	48 DP-1	48 DP-1	62 DP-1	62 DP-1
Days After Emergence	30 DE-1	30 DE-1	44 DE-1	44 DE-1
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code	15*	16*
8 ARMEZON PRO	18 fl oz/a B		85.0 ab	100.0 a
AATREX	12 fl oz/a B			0.0 -
ROUNDUP POWERMAX	1 qt/a B			99.5 a
N-PAK AMS	2.5 % v/v B			97.0 a
9 VERDICT	10 fl oz/a A		88.8 ab	100.0 a
ARMEZON PRO	18 fl oz/a C			0.0 -
AATREX	12 fl oz/a C			100.0 a
ROUNDUP POWERMAX	1 qt/a C			99.5 a
N-PAK AMS	2.5 % v/v C			
10 VERDICT	15 fl oz/a A		85.0 ab	97.5 a
STATUS	5 oz/a C			0.0 -
ROUNDUP POWERMAX	1 qt/a C			97.5 a
N-PAK AMS	2.5 % v/v C			97.5 a
11 HARNESS XTRA	3.2 pt/a A		82.5 b	93.8 a
IMPACTZ	10.7 fl oz/a C			0.0 -
MSO ULTRA	1 % v/v C			98.3 a
N-PAK AMS	2.5 % v/v C			95.0 a
12 HARNESS XTRA	3.2 pt/a A		85.0 ab	98.8 a
IMPACTZ	8 fl oz/a C			0.0 -
LIBERTY 280 SL	22 fl oz/a C			95.0 a
MSO ULTRA	0.5 % v/v C			93.8 a
N-PAK AMS	2.5 % v/v C			
13 HARNESS	1.75 pt/a B		86.3 ab	99.5 a
IMPACT	1 fl oz/a B			0.0 -
AATREX	1 pt/a B			98.8 a
MSO ULTRA	0.5 % v/v B			98.8 a
N-PAK AMS	2.5 % v/v B			
14 HARNESS	1.75 pt/a B		90.0 ab	100.0 a
IMPACT	0.75 fl oz/a B			0.0 -
ROUNDUP POWERMAX	32 fl oz/a B			98.5 a
AATREX	1 pt/a B			98.8 a
MSO ULTRA	0.25 % v/v B			
N-PAK AMS	2.5 % v/v B			
15 HELMET	1.67 pt/a A		90.0 ab	97.5 a
HAI TRADENAME	3.42 fl oz/a C			0.0 -
MSO ULTRA	1 % v/v C			98.3 a
28% UAN	2.5 % v/v C			95.0 a
16 HELMET	1.67 pt/a A		88.8 ab	100.0 a
HAI TRADENAME	3.42 fl oz/a C			0.0 -
AATREX	1 pt/a C			100.0 a
MSO ULTRA	1 % v/v C			98.8 a
28% UAN	2.5 % v/v C			
LSD P=.05	5.51	5.86	.	10.61
Standard Deviation	3.87	4.11	0.00	7.45
CV	4.73	4.44	0.0	8.42
Levene's F	1.392	0.739	0.00	3.926
Levene's Prob(F)	0.19	0.734	.	0.001*
Skewness	-3.3738*	-3.5581*	.	-2.7014*
Kurtosis	10.5625*	11.3163*	.	6.3809*
Replicate F	2.641	0.589	0.000	1.786
Replicate Prob(F)	0.0608	0.6253	1.0000	0.1633
Treatment F	130.604	145.075	0.000	48.679
Treatment Prob(F)	0.0001	0.0001	1.0000	0.0001

# North Dakota State University

## Weed Management Programs in Corn

Trial ID: 19S-PROSPER-CORN-01	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-CORN-01	Investigator (Creator): Dr. Joe Ikley	
Project ID:	Study Director: Joe Ikley	
	Sponsor Contact: Syngenta, AMVAC, BASF	

Pest Type	W Weed	W Weed	W Weed
Pest Code	CHEAL	XANST	AMBEL
Pest Scientific Name	Chenopodium album	Xanthium strumarium	Ambrosia artemisiifolia
Pest Name	common lambsquarters	Common cocklebur	Common ragweed
Rating Date	Jul-16-2019	Jul-16-2019	Jul-16-2019
Rating Type	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%
Number of Subsamples	1	1	1
Data Entry Date	Jul-31-2019	Jul-31-2019	Jul-31-2019
Days After First/Last Applic.	60 28	60 28	60 28
Plant-Eval Interval	62 DP-1	62 DP-1	62 DP-1
Days After Emergence	44 DE-1	44 DE-1	44 DE-1
Trt Treatment			
No. Name	Rate Unit Code	20*	21*
1 Untreated Check		0.0 b	0.0 e
2 ACURON	2.5 qt/a A	100.0 a	81.3 d
3 ACURON FLEXI	2 qt/a A	95.0 a	81.3 d
4 ACURON	1.25 qt/a A	100.0 a	95.0 ab
ACURON	1.25 qt/a C		
ROUNDUP POWERMAX	1 qt/a C		
N-PAK AMS	2.5 % v/v C		
5 ACURON FLEXI	1 qt/a A	100.0 a	93.8 abc
ACURON FLEXI	1 qt/a C		
ROUNDUP POWERMAX	1 qt/a C		
N-PAK AMS	2.5 % v/v C		
6 ACURON	1.25 qt/a A	100.0 a	93.3 abc
HALEX GT	3.6 pt/a C		
AATREX	0.5 pt/a C		
ACTIVATOR 90 - NIS	0.25 % v/v C		
N-PAK AMS	2.5 % v/v C		
7 ACURON	2.5 qt/a B	100.0 a	96.5 a
ROUNDUP POWERMAX	1 qt/a B		
N-PAK AMS	2.5 % v/v B		

## North Dakota State University

Trial ID: 19S-PROSPER-CORN-01	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-CORN-01	Investigator (Creator): Dr. Joe Ikley	
Project ID:	Study Director: Joe Ikley	
Sponsor Contact: Syngenta, AMVAC, BASF		

Pest Type	W Weed	W Weed	W Weed
Pest Code	CHEAL	XANST	AMBEL
Pest Scientific Name	Chenopodium album	Xanthium strumarium	Ambrosia artemisiifolia
Pest Name	common lambsquarters	Common cocklebur	Common ragweed
Rating Date	Jul-16-2019	Jul-16-2019	Jul-16-2019
Rating Type	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%
Number of Subsamples	1	1	1
Data Entry Date	Jul-31-2019	Jul-31-2019	Jul-31-2019
Days After First/Last Applic.	60 28	60 28	60 28
Plant-Eval Interval	62 DP-1	62 DP-1	62 DP-1
Days After Emergence	44 DE-1	44 DE-1	44 DE-1
Trt Treatment	Rate	Appl	
No. Name	Rate Unit	Code	
			20*
			21*
			22*
8 ARMEZON PRO	18 fl oz/a B		100.0 a
AATREX	12 fl oz/a B		82.5 cd
ROUNDUP POWERMAX	1 qt/a B		100.0 a
N-PAK AMS	2.5 % v/v B		
9 VERDICT	10 fl oz/a A		100.0 a
ARMEZON PRO	18 fl oz/a C		86.3 a-d
AATREX	12 fl oz/a C		
ROUNDUP POWERMAX	1 qt/a C		100.0 a
N-PAK AMS	2.5 % v/v C		
10 VERDICT	15 fl oz/a A		100.0 a
STATUS	5 oz/a C		80.0 d
ROUNDUP POWERMAX	1 qt/a C		
N-PAK AMS	2.5 % v/v C		97.5 a
11 HARNESS XTRA	3.2 pt/a A		100.0 a
IMPACTZ	10.7 fl oz/a C		78.8 d
MSO ULTRA	1 % v/v C		
N-PAK AMS	2.5 % v/v C		92.5 a
12 HARNESS XTRA	3.2 pt/a A		100.0 a
IMPACTZ	8 fl oz/a C		80.0 d
LIBERTY 280 SL	22 fl oz/a C		
MSO ULTRA	0.5 % v/v C		100.0 a
N-PAK AMS	2.5 % v/v C		
13 HARNESS	1.75 pt/a B		100.0 a
IMPACT	1 fl oz/a B		83.8 bcd
AATREX	1 pt/a B		
MSO ULTRA	0.5 % v/v B		99.5 a
N-PAK AMS	2.5 % v/v B		
14 HARNESS	1.75 pt/a B		100.0 a
IMPACT	0.75 fl oz/a B		86.3 a-d
ROUNDUP POWERMAX	32 fl oz/a B		
AATREX	1 pt/a B		100.0 a
MSO ULTRA	0.25 % v/v B		
N-PAK AMS	2.5 % v/v B		
15 HELMET	1.67 pt/a A		99.8 a
HAI TRADENAME	3.42 fl oz/a C		86.3 a-d
MSO ULTRA	1 % v/v C		
28% UAN	2.5 % v/v C		98.8 a
16 HELMET	1.67 pt/a A		100.0 a
HAI TRADENAME	3.42 fl oz/a C		86.3 a-d
AATREX	1 pt/a C		
MSO ULTRA	1 % v/v C		100.0 a
28% UAN	2.5 % v/v C		
LSD P=.05	3.57	7.22	6.36
Standard Deviation	2.51	5.07	4.47
CV	2.68	6.28	4.82
Levene's F	0.993	0.897	0.823
Levene's Prob(F)	0.477	0.572	0.648
Skewness	-3.6444*	-3.0455*	-3.5393*
Kurtosis	11.768*	9.0354*	11.1832*
Replicate F	0.965	3.160	0.404
Replicate Prob(F)	0.4177	0.0336	0.7509
Treatment F	396.324	77.186	123.331
Treatment Prob(F)	0.0001	0.0001	0.0001

# North Dakota State University

## Weed Management Programs in Corn

Trial ID: 19S-PROSPER-CORN-01	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-CORN-01	Investigator (Creator): Dr. Joe Ikley	
Project ID:	Study Director: Joe Ikley	
	Sponsor Contact: Syngenta, AMVAC, BASF	

Pest Type

W, Weed = Weed or volunteer crop

Pest Code

SETPU, Setaria helvola, yellow foxtail = US  
 HELAN, Helianthus annuus, Common sunflower = US  
 CHEAL, Chenopodium album, common lambsquarters = US  
 XANST, Xanthium strumarium, Common cocklebur = US  
 AMBEL, Ambrosia artemisiifolia, Common ragweed = US

Rating Type

CONTRO = control / burndown or knockdown

Rating Unit

% = percent

Plant-Eval Interval

29 DP-1 = 1 ZEAMX May-15-2019  
 41 DP-1 = 1 ZEAMX May-15-2019  
 48 DP-1 = 1 ZEAMX May-15-2019  
 62 DP-1 = 1 ZEAMX May-15-2019

Trial Comments

Crops and weeds took nearly 3 weeks to emerge due to cold, wet spell after planting. Heavy rains persisted from late June through the first half of July that kept soils saturated for several weeks.

# North Dakota State University

Trial ID: 19S-PROSPER-CORN-12 Protocol ID: 19S-PROSPER-CORN-12 Project ID: 2019-01-24-08	<b>Intergrated Corn Herbicide Programs</b> Location: PROSPER Investigator (Creator): Dr. Joe Ikley Study Director: Joe Ikley Sponsor Contact: Bayer - Steve Valenti
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## General Trial Information

**Study Director:** Joe Ikley  
**Investigator:** Dr. Joe Ikley

**Trial Status:** E established  
**Trial Status Date:** Jun-7-2019  
**ARM Trial Created On:** May-10-2019

**Last Changed By:** Dr. Joe Ikley

**Protocol Revision Date:** Apr-23-2019

**Conducted Under GLP:** No  
**Conducted Under GEP:** No

## Contacts

**Role:** STYDIR study director  
**Study Director:** Joe Ikley

**Role:** INVEST investigator  
**Investigator:** Dr. Joe Ikley

**Role:** SPONSR sponsor  
**Sponsor:** Bayer - Steve Valenti

## Site and Design

**Treated Plot Width:** 6.67 FT  
**Treated Plot Length:** 30 FT  
**Treated Plot Area:** 200.1 FT2 **Treatments:** 18  
**Replications:** 4 **Study Design:** RACOB LRandomized Complete Block (RCB)

## Soil Description

**Description Name:** Prosper  
**% Sand:** 24.7 **% OM:** 4 **Texture:** SIL silt loam  
**% Silt:** 53.3 **pH:** 7.3 **Soil Name:** Kindred-Bearden Silty Clay Loam  
**% Clay:** 22 **CEC:** 18.5

## Application Description

	A	B	C
<b>Application Date</b>	May-17-2019	Jun-13-2019	Jun-18-2019
<b>Appl. Start Time</b>	8:30 AM	9:40 AM	9:20 AM
<b>Appl. Stop Time</b>	9:00 AM	9:55 AM	9:40 AM
<b>Application Method</b>	SPRAY	SPRAY	SPRAY
<b>Application Timing</b>	PREEM		
<b>Application Placement</b>	BROADC	BROADC	BROADC
<b>Applied By</b>	Ikley, J.	Haugrud, N.	Haugrud, N.
<b>Appl. Entry Date</b>	Jun-7-2019	Jun-18-2019	Jun-18-2019
<b>Air Temperature Start, Stop</b>	46 49 F	72 73 F	66 67 F
<b>% Relative Humidity Start, Stop</b>	59 55	33 33	76 71
<b>Wind Velocity+Dir. Start</b>	8 MPH NNE	8 MPH SSW	4 MPH N
<b>Wind Velocity+Dir. Stop</b>	8 MPH NNE	9 MPH SSW	5 MPH N
<b>Wind Velocity+Dir. Max</b>	10 MPH NNE		
<b>Wet Leaves (Y/N)</b>	N no	N no	N no
<b>Soil Temperature</b>	47 F	62 F	65 F
<b>Soil Moisture</b>	GOOD	DRY	DRY
<b>Soil Surface Condition</b>	CLOTRA	CLOTRA	CLOTRA
<b>% Cloud Cover</b>	0	40	30



# North Dakota State University

Trial ID: 19S-PROSPER-CORN-12 Protocol ID: 19S-PROSPER-CORN-12 Project ID: 2019-01-24-08	<b>Intergrated Corn Herbicide Programs</b> Location: PROSPER Investigator (Creator): Dr. Joe Ikley Study Director: Joe Ikley Sponsor Contact: Bayer - Steve Valenti
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Application Equipment			
	A	B	C
<b>Appl. Equipment</b>	Mjолnir	Narsil	Narsil
<b>Equipment Type</b>	BACCAI	BACCAI	BACCAI
<b>Operation Pressure</b>	28 PSI	28 PSI	28 PSI
<b>Nozzle Type</b>	TTI	XR	XR
<b>Nozzle Size</b>	11002	8002	8002
<b>Nozzle Spacing</b>	20 IN	20 IN	20 IN
<b>Boom Length</b>	6.67 FT	6.67 FT	6.67 FT
<b>Boom Height</b>	18 IN	18 IN	18 IN
<b>Ground Speed</b>	3 MPH	3 MPH	3 MPH
<b>Carrier</b>	WATER	WATER	WATER
<b>Application Amount</b>	15 GAL/AC	15 GAL/AC	15 GAL/AC
<b>Mix Size</b>	1119 mL	1119 mL	1119 mL
<b>Propellant</b>	COMCO2	COMCO2	COMCO2

Context	Date	By	Notes
STATUS	May-10-2019	Dr. Joe Ikley	Automatically added by ARM: Trial Status updated to 'S' during trial creation.
STATUS	Jun-7-2019	Dr. Joe Ikley	Automatically added by ARM: Trial Status updated to 'E' when Application Date entered.

Pest Type		W Weed	W Weed	W Weed			
Pest Code		SETPU	CHEAL	HELAN			
Pest Scientific Name		Setaria helvola	Chenopodium album	Helianthus annuus			
Pest Name		yellow foxtail	common lambsquarters	Common sunflower			
Crop Type, Code	C ZEAMX				C ZEAMX		
Crop Scientific Name	Zea mays				Zea mays		
Crop Name	Corn				Corn		
Rating Date	Jun-13-2019	Jun-13-2019	Jun-13-2019	Jun-13-2019	Jul-2-2019		
Rating Type	PHYTO	CONTRO	CONTRO	CONTRO	PHYTO		
Rating Unit	%	%	%	%	%		
Number of Subsamples	1	1	1	1	1		
Data Entry Date	Aug-1-2019	Aug-1-2019	Aug-1-2019	Aug-1-2019	Aug-1-2019		
Days After First/Last Applic.	27 27	27 27	27 27	27 27	46 14		
Days After Emergence	11 DE-1	11 DE-1	11 DE-1	11 DE-1	30 DE-1		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	1*	2*	3*	4*	5*
1 HARNESS	44 fl oz/a	A	2.5 -	93.8 ab	97.5 a	71.3 c	0.0 b
AATREX	12.2 fl oz/a	A					
2 HARNESS	24 fl oz/a	A	2.5 -	87.5 ab	100.0 a	83.8 ab	0.0 b
BALANCE FLEXX	3 fl oz/a	A					
3 HARNESS	24 fl oz/a	A	2.5 -	75.0 bc	100.0 a	83.8 ab	0.0 b
AATREX	12.2 fl oz/a	A					
BALANCE FLEXX	3 fl oz/a	A					
4 AATREX	12.2 fl oz/a	A	0.0 -	75.0 bc	98.8 a	83.8 ab	0.0 b
BALANCE FLEXX	3 fl oz/a	A					
5 HARNESS XTRA	29 fl oz/a	A	2.5 -	85.0 ab	98.8 a	77.5 bc	0.0 b
6 HARNESS MAX	2 qt/a	A	2.5 -	95.0 a	100.0 a	95.0 a	0.0 b
AATREX	12.2 fl oz/a	A					
7 ACURON	2.5 qt/a	A	1.3 -	87.5 ab	100.0 a	96.3 a	0.0 b
8 RESICORE	2.5 qt/a	A	1.3 -	93.8 ab	100.0 a	96.3 a	0.0 b
AATREX	12.2 fl oz/a	A					
9 HARNESS MAX	2 qt/a	A	1.3 -	83.8 ab	100.0 a	93.8 a	0.0 b
AATREX	12.2 fl oz/a	A					
DIFLEXX	8 fl oz/a	C					
MSO ULTRA	1 % v/v	C					

# North Dakota State University

Intergrated Corn Herbicide Programs								
Trial ID: 19S-PROSPER-CORN-12		Location: PROSPER						
Protocol ID: 19S-PROSPER-CORN-12		Investigator (Creator): Dr. Joe Ikley						
Project ID: 2019-01-24-08		Study Director: Joe Ikley						
Sponsor Contact: Bayer - Steve Valenti								
Pest Type		W Weed	W Weed	W Weed				
Pest Code		SETPU	CHEAL	HELAN				
Pest Scientific Name		Setaria helvola	Chenopodium album	Helianthus annuus				
Pest Name		yellow foxtail	common lambsquarters	Common sunflower				
Crop Type, Code	C ZEAMX				C ZEAMX			
Crop Scientific Name	Zea mays				Zea mays			
Crop Name	Corn				Corn			
Rating Date	Jun-13-2019	Jun-13-2019	Jun-13-2019	Jun-13-2019	Jul-2-2019			
Rating Type	PHYTO	CONTRO	CONTRO	CONTRO	PHYTO			
Rating Unit	%	%	%	%	%			
Number of Subsamples	1	1	1	1	1			
Data Entry Date	Aug-1-2019	Aug-1-2019	Aug-1-2019	Aug-1-2019	Aug-1-2019			
Days After First/Last Applic.	27 27	27 27	27 27	27 27	46 14			
Days After Emergence	11 DE-1	11 DE-1	11 DE-1	11 DE-1	30 DE-1			
Trt No.	Treatment Name	Rate	Appl Code	1*	2*	3*	4*	5*
10	HARNESS MAX	2 qt/a	A	2.5 -	92.5 ab	100.0 a	93.8 a	3.8 a
	AATREX	12.2 fl oz/a	A					
	DIFLEXX DUO	24 fl oz/a	C					
	MSO ULTRA	1 % v/v	C					
11	HARNESS MAX	2 qt/a	A	0.0 -	85.0 ab	100.0 a	92.5 a	0.0 b
	AATREX	12.2 fl oz/a	A					
	CAPRENO	3 fl oz/a	C					
	ACTIVATOR 90 - NIS	0.25 % v/v	C					
	N-PAK AMS	2.5 % v/v	C					
12	CORVUS	3.3 fl oz/a	A	1.3 -	78.8 ab	100.0 a	90.0 a	0.0 b
	AATREX	12.2 fl oz/a	A					
	HARNESS MAX	1.75 qt/a	B					
	ACTIVATOR 90 - NIS	0.25 % v/v	B					
	N-PAK AMS	2.5 % v/v	B					
13	HARNESS	0.75 qt/a	A	1.3 -	86.3 ab	98.8 a	83.8 ab	0.0 b
	BALANCE FLEXX	3 fl oz/a	A					
	DIFLEXX	8 fl oz/a	C					
	MSO ULTRA	1 % v/v	C					
14	HARNESS	0.75 qt/a	A	2.5 -	90.0 ab	100.0 a	83.8 ab	0.0 b
	BALANCE FLEXX	3 fl oz/a	A					
	CAPRENO	3 fl oz/a	C					
	ACTIVATOR 90 - NIS	0.25 % v/v	C					
	N-PAK AMS	2.5 % v/v	C					
15	HARNESS MAX	40 fl oz/a	A	1.3 -	62.5 c	100.0 a	90.0 a	0.0 b
	HARNESS MAX	40 fl oz/a	B					
	ACTIVATOR 90 - NIS	0.25 % v/v	B					
	N-PAK AMS	2.5 % v/v	B					
16	DEGREE XTRA	1.5 qt/a	B	0.0 -	0.0 d	0.0 b	0.0 d	0.0 b
	CAPRENO	3 fl oz/a	B					
	ACTIVATOR 90 - NIS	0.25 % v/v	B					
	N-PAK AMS	2.5 % v/v	B					
17	HALEX GT	3.6 pt/a	B	0.0 -	0.0 d	0.0 b	0.0 d	0.0 b
	AATREX	12.2 fl oz/a	B					
	ACTIVATOR 90 - NIS	0.25 % v/v	B					
	N-PAK AMS	2.5 % v/v	B					
18	ACURON	1.25 qt/a	A	0.0 -	88.8 ab	97.5 a	91.3 a	0.8 b
	HALEX GT	3.6 pt/a	C					
	ACTIVATOR 90 - NIS	0.25 % v/v	C					
	N-PAK AMS	2.5 % v/v	C					
LSD P=.05		3.45	10.89		2.81	7.17	0.97	
Standard Deviation		2.43	7.67		1.98	5.05	0.68	
CV		175.03	10.15		2.24	6.47	272.49	
Levene's F		1.247	2.563		0.797	3.341	0.948	
Levene's Prob(F)		0.262	0.005*		0.689	0.001*	0.526	
Skewness		1.3976*	-2.0275*		-2.5111*	-2.173*	4.1724*	
Kurtosis		0.8718	2.7871*		4.4612*	3.4115*	16.2406*	
Replicate F		2.037	2.045		0.562	3.966	1.317	
Replicate Prob(F)		0.1203	0.1191		0.6427	0.0129	0.2790	
Treatment F		0.733	55.789		1057.612	133.632	6.845	
Treatment Prob(F)		0.7554	0.0001		0.0001	0.0001	0.0001	

# North Dakota State University

## Intergrated Corn Herbicide Programs

Trial ID: 19S-PROSPER-CORN-12	Location: PROSPER
Protocol ID: 19S-PROSPER-CORN-12	Investigator (Creator): Dr. Joe Ikley
Project ID: 2019-01-24-08	Study Director: Joe Ikley
	Sponsor Contact: Bayer - Steve Valenti

Pest Type	W Weed	W Weed	W Weed	W Weed
Pest Code	SETPU	CHEAL	HELAN	AMBEL
Pest Scientific Name	Setaria helvola	Chenopodium album	Helianthus annuus	Ambrosia artemisiifolia
Pest Name	yellow foxtail	common lambsquarters	Common sunflower	Common ragweed
Crop Type, Code				
Crop Scientific Name				
Crop Name				
Rating Date	Jul-2-2019	Jul-2-2019	Jul-2-2019	Jul-2-2019
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Aug-1-2019	Aug-1-2019	Aug-1-2019	Aug-1-2019
Days After First/Last Applic.	46 14	46 14	46 14	46 14
Days After Emergence	30 DE-1	30 DE-1	30 DE-1	30 DE-1
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code		
			6*	7*
1 HARNESS	44 fl oz/a A		57.5 b-f	97.5 a
AATREX	12.2 fl oz/a A			20.0 de
2 HARNESS	24 fl oz/a A		52.5 c-f	100.0 a
BALANCE FLEXX	3 fl oz/a A			37.5 cd
3 HARNESS	24 fl oz/a A		33.0 fg	100.2 a
AATREX	12.2 fl oz/a A			50.0 bc
BALANCE FLEXX	3 fl oz/a A			82.5 a
4 AATREX	12.2 fl oz/a A		20.0 g	92.5 b
BALANCE FLEXX	3 fl oz/a A			48.0 bc
5 HARNESS XTRA	29 fl oz/a A		82.8 abc	100.0 a
6 HARNESS MAX	2 qt/a A		50.0 def	100.0 a
AATREX	12.2 fl oz/a A			67.5 ab
7 ACURON	2.5 qt/a A		67.5 a-e	100.0 a
8 RESICORE	2.5 qt/a A		86.3 ab	100.0 a
AATREX	12.2 fl oz/a A			97.5 a
9 HARNESS MAX	2 qt/a A		52.5 c-f	100.0 a
AATREX	12.2 fl oz/a A			97.5 a
DIFLEXX	8 fl oz/a C			
MSO ULTRA	1 % v/v C			100.0 a

# North Dakota State University

Intergrated Corn Herbicide Programs				
Trial ID: 19S-PROSPER-CORN-12		Location: PROSPER		
Protocol ID: 19S-PROSPER-CORN-12		Investigator (Creator): Dr. Joe Ikley		
Project ID: 2019-01-24-08		Study Director: Joe Ikley		
Sponsor Contact: Bayer - Steve Valenti				
Pest Type	W Weed	W Weed	W Weed	W Weed
Pest Code	SETPU	CHEAL	HELAN	AMBEL
Pest Scientific Name	Setaria helvola	Chenopodium album	Helianthus annuus	Ambrosia artemisiifolia
Pest Name	yellow foxtail	common lambsquarters	Common sunflower	Common ragweed
Crop Type, Code				
Crop Scientific Name				
Crop Name				
Rating Date	Jul-2-2019	Jul-2-2019	Jul-2-2019	Jul-2-2019
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Aug-1-2019	Aug-1-2019	Aug-1-2019	Aug-1-2019
Days After First/Last Applic.	46 14	46 14	46 14	46 14
Days After Emergence	30 DE-1	30 DE-1	30 DE-1	30 DE-1
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code	6*	7*
10 HARNESS MAX	2 qt/a	A	100.0 a	100.0 a
AATREX	12.2 fl oz/a	A		
DIFLEXX DUO	24 fl oz/a	C		
MSO ULTRA	1 % v/v	C		
11 HARNESS MAX	2 qt/a	A	92.5 a	100.0 a
AATREX	12.2 fl oz/a	A		
CAPRENO	3 fl oz/a	C		
ACTIVATOR 90 - NIS	0.25 % v/v	C		
N-PAK AMS	2.5 % v/v	C		
12 CORVUS	3.3 fl oz/a	A	76.3 a-d	100.0 a
AATREX	12.2 fl oz/a	A		
HARNESS MAX	1.75 qt/a	B		
ACTIVATOR 90 - NIS	0.25 % v/v	B		
N-PAK AMS	2.5 % v/v	B		
13 HARNESS	0.75 qt/a	A	37.5 efg	100.0 a
BALANCE FLEXX	3 fl oz/a	A		
DIFLEXX	8 fl oz/a	C		
MSO ULTRA	1 % v/v	C		
14 HARNESS	0.75 qt/a	A	96.3 a	100.0 a
BALANCE FLEXX	3 fl oz/a	A		
CAPRENO	3 fl oz/a	C		
ACTIVATOR 90 - NIS	0.25 % v/v	C		
N-PAK AMS	2.5 % v/v	C		
15 HARNESS MAX	40 fl oz/a	A	52.5 c-f	100.0 a
HARNESS MAX	40 fl oz/a	B		
ACTIVATOR 90 - NIS	0.25 % v/v	B		
N-PAK AMS	2.5 % v/v	B		
16 DEGREE XTRA	1.5 qt/a	B	87.5 ab	98.8 a
CAPRENO	3 fl oz/a	B		
ACTIVATOR 90 - NIS	0.25 % v/v	B		
N-PAK AMS	2.5 % v/v	B		
17 HALEX GT	3.6 pt/a	B	90.0 a	100.0 a
AATREX	12.2 fl oz/a	B		
ACTIVATOR 90 - NIS	0.25 % v/v	B		
N-PAK AMS	2.5 % v/v	B		
18 ACURON	1.25 qt/a	A	100.0 a	100.0 a
HALEX GT	3.6 pt/a	C		
ACTIVATOR 90 - NIS	0.25 % v/v	C		
N-PAK AMS	2.5 % v/v	C		
LSD P=.05	20.32	3.70	20.55	16.28
Standard Deviation	14.30	2.61	14.47	11.47
CV	20.74	2.62	18.43	12.58
Levene's F	2.632	4.207	4.988	4.107
Levene's Prob(F)	0.004*	0.001*	0.001*	0.001*
Skewness	-0.5427	-5.3026*	-1.264*	-2.552*
Kurtosis	-1.0204	30.3987*	0.0308	6.5347*
Replicate F	0.688	1.442	1.970	1.987
Replicate Prob(F)	0.5639	0.2416	0.1305	0.1275
Treatment F	11.697	1.974	17.366	7.235
Treatment Prob(F)	0.0001	0.0323	0.0001	0.0001

## North Dakota State University

Trial ID: 19S-PROSPER-CORN-12 Protocol ID: 19S-PROSPER-CORN-12 Project ID: 2019-01-24-08	<p style="text-align: center;"><b>Intergrated Corn Herbicide Programs</b></p> Location: PROSPER Investigator (Creator): Dr. Joe Ikley Study Director: Joe Ikley Sponsor Contact: Bayer - Steve Valenti
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**Pest Type**

W, Weed = Weed or volunteer crop

**Pest Code**

SETPU, Setaria helvola, yellow foxtail = US

CHEAL, Chenopodium album, common lambsquarters = US

HELAN, Helianthus annuus, Common sunflower = US

AMBEL, Ambrosia artemisiifolia, Common ragweed = US

**Crop Type, Code**

C = EPPO species (Bayer) codes

ZEAMX, BCOR, Zea mays, Corn = US

**Rating Type**

CONTRO = control / burndown or knockdown

**Rating Unit**

% = percent

**Trial Comments**

General comments: The growing season was abnormal with excessive rain in the second half of June and most of July. The corn crop was relatively healthy all season with a good stand and canopy.

**Volunteer corn control with herbicide+ Dicamba.** Dr. Howatt and Mettler. DKC40-77RIB corn was seeded May 17, 2019 to simulate volunteer corn infestation. Treatments were applied to V5 corn and 6 to 8 inch redroot pigweed on July 16 with 74°F, 79% relative humidity, 100% cloud-cover, 0.9 mph wind velocity at 270°, and moist soil surface at 74°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 40 psi through 11001 TT nozzles to a 7 foot wide area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	Jul-31-2019	Aug-14-2019
		Vcorn	Vcorn
	oz ai/A	%	%
Quiz+HSOC	0.4+20	85	93
Quiz+Dica-X+HSOC	0.4+8+20	74	81
Quiz+Dica-X+HSOC	0.5+8+20	79	88
Quiz+Dica-X+HSOC	0.9+8+20	86	95
Flzp+HSOC	0.75+20	82	92
Flzp+Dica-X+HSOC	0.75+8+20	64	80
Flzp+Dica-X+HSOC	1+8+20	71	85
Flzp+Dica-X+HSOC	1.5+8+20	74	88
Cleth+HSOC	0.75+20	80	89
Cleth+Dica-X+HSOC	0.75+8+20	71	76
Cleth+Dica-X+HSOC	1+8+20	79	85
Cleth+Dica-X+HSOC	1.5+8+20	80	89
CV		3.18	2.99
LSD P=.05		3.53	3.73

**Volunteer Corn Control with herbicide+2,4-D.** Dr. Howatt and Mettler. DKC40-77RIB corn was seeded May 17 as a simulated corn infestation. Treatments were applied to V5 corn and 6 to 8 inch redroot pigweed on July 16 with 76°F, 78% relative humidity, 100% cloud-cover, 2 mph wind velocity at 325°, and moist soil surface at 74°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 40 psi through 11001 TT nozzles to a 7 foot wide area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	corn July 31	corn August 14
	oz ai/A	%	%
Quiz+HSOC	0.4+20	85	93
Quiz+2,4-D-CH+HSOC	0.4+16+20	27	0
Quiz+2,4-D-CH+HSOC	0.5+16+20	32	0
Quiz+2,4-D-CH+HSOC	0.9+16+20	76	84
Flzp+HSOC	0.75+20	82	90
Flzp+2,4-D-CH+HSOC	0.75+16+20	61	75
Flzp+2,4-D-CH+HSOC	1+16+20	67	80
Flzp+2,4-D-CH+HSOC	1.5+16+20	72	86
Cleth+HSOC	0.75+20	82	91
Cleth+2,4-D-CH+HSOC	0.75+16+20	74	76
Cleth+2,4-D-CH+HSOC	1+16+20	80	88
Cleth+2,4-D-CH+HSOC	1.5+16+20	86	94

**Tribenuron PRE in soybean.** Dr, Howatt and Mettler. ND17009GT soybeans seeded on May 21, 2019.

Treatments were applied as follows:

Treatments	1 DBP	Glyphosate overspray	1 T	3 T
Date	May 21	June 13	June 17	July 3
Crop stage	Pre-plant	-	1 trifoliolate	3 trifoliolate
Air temperature °F	60	67	58	79
Relative humidity %	46	29	79	66
Sky condition % clouds	50	0	100	75
Wind velocity mph	10	8.36	6	3
Wind direction °	90	180	270	90
Soil moisture	Dry surface	Dry surface	Moist surface	Moist surface
Soil temperature °F	56	63	60	72
Yellow foxtail	-	-	-	1 leaf
Venice mallow	-	-	-	Cotyledon to 1 leaf

All treatments were applied with a backpack sprayer delivering 8.5 gpa at 40 psi through 11001 TT nozzles to a 7 foot wide area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate (oz ai/A)	Growth Stage	5/28	6/4	6/19	6/25	7/1	Sobe
			Sobe	Sobe	Sobe	Sobe	Sobe	
Untreated Check	0		0	0	0	0	0	0
Trib-C+Glyt-4.5	0.11+6.4	1 DBP	0	0	0	0	0	0
Trib-sg+Glyt-4.5	0.11+6.4	1 DBP	0	0	0	0	0	0
Trib-C+Glyt-4.5	0.22+12.8	1 DBP	0	0	0	0	0	0
Thif-V+Glyt-4.5	0.086+6.4	1 T	0	0	5.8	7	0	0
Thif-V+Glyt-4.5/Bent&Immx+merge	0.086+6.4/6.4+24	1 T/ 3T	0	0	4.5	4	0	0
CV			0.0	0.0	41.74	61.39	0.00	0.00
LSD P=.05			.	.	1.07	1.70	.	.



## North Dakota State University

Trial ID: 19S-PROSPER-SOY-02 Protocol ID: 19S-PROSPER-SOY-02 Project ID: HDC050A4-2019US	<b style="text-align: center;">Tavium Plus VaporGrip Technology Programs in Xtend Soybean</b> Location: PROSPER Investigator (Creator): Dr. Joe Ikley Study Director: Joe Ikley Sponsor Contact: Syngenta - Brett Miller
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<b>General Trial Information</b>	
Study Director: Joe Ikley	
Investigator: Dr. Joe Ikley	
Trial Status: E established	
Trial Status Date: Jun-7-2019	Last Changed By: Dr. Joe Ikley
ARM Trial Created On: May-9-2019	
	Protocol Revision Date: Apr-23-2019
Conducted Under GLP: No	
Conducted Under GEP: No	

<b>Contacts</b>	
Role: STYDIR study director	
Study Director: Joe Ikley	
Role: INVEST investigator	
Investigator: Dr. Joe Ikley	
Role: SPONSR sponsor	
Sponsor: Syngenta - Brett Miller	

<b>Site and Design</b>	
Treated Plot Width: 6.67 FT	
Treated Plot Length: 30 FT	
Treated Plot Area: 200.1 FT <sup>2</sup>	Treatments: 7
Replications: 4	Study Design: RACOB Randomized Complete Block (RCB)

<b>Soil Description</b>	
Description Name: Prosper	
% Sand: 24.7	% OM: 4
% Silt: 53.3	pH: 7.3
% Clay: 22	CEC: 18.5
Texture: SIL	silt loam
Soil Name: Kindred-Bearden Silty Clay Loam	

<b>Application Description</b>		
	<b>A</b>	<b>B</b>
Application Date	May-17-2019	Jun-17-2019
Appl. Start Time	7:30 AM	8:30 AM
Appl. Stop Time	8:00 AM	9:00 AM
Application Method	SPRAY	SPRAY
Application Timing	PREEM	11
Application Placement	BROADC	BROADC
Applied By	Haugrud, N.	Haugrud, N.
Appl. Entry Date	Jun-7-2019	Jun-18-2019
Air Temperature Start, Stop	41 43 F	57 58 F
% Relative Humidity Start, Stop	65 63	83 81
Wind Velocity+Dir. Start	8 MPH NNE	6 MPH WNW
Wind Velocity+Dir. Stop	8.5 MPH NNE	7 MPH WNW
Wind Velocity+Dir. Max	10 MPH NNE	9 MPH WNW
Wet Leaves (Y/N)	N no	N no
Soil Temperature	46 F	60 F
Soil Moisture	GOOD	DRY
Soil Surface Condition	CLOTRA	
% Cloud Cover	0	30

# North Dakota State University

Trial ID: 19S-PROSPER-SOY-02	Location: PROSPER
Protocol ID: 19S-PROSPER-SOY-02	Investigator (Creator): Dr. Joe Ikley
Project ID: HDC050A4-2019US	Study Director: Joe Ikley
	Sponsor Contact: Syngenta - Brett Miller

Application Equipment				
	A		B	
Appl. Equipment	Narsil		Narsil	
Equipment Type	BACCAI		BACCAI	
Operation Pressure	28	PSI	28	PSI
Nozzle Type	TTI		TTI	
Nozzle Size	11002		11002	
Nozzle Spacing	20	IN	20	IN
Boom Length	6.67	FT	6.67	FT
Boom Height	18	IN	18	IN
Ground Speed	3	MPH	3	MPH
Carrier	WATER		WATER	
Application Amount	15	GAL/AC	15	GAL/AC
Mix Size	1119	mL	1119	mL
Propellant	COMCO2		COMCO2	

Context	Date	By	Notes
STATUS	May-9-2019	Dr. Joe Ikley	Automatically added by ARM: Trial Status updated to 'S' during trial creation.
STATUS	Jun-7-2019	Dr. Joe Ikley	Automatically added by ARM: Trial Status updated to 'E' when Application Date entered.

Pest Type Pest Code Pest Scientific Name Pest Name	C GLXMA Glycine max Soybean	W Weed	W Weed	W Weed		
		CHEAL Chenopodium album common lambsquarters	HELAN Helianthus annuus Common sunflower	CHEAL Chenopodium album common lambsquarters		
Crop Type, Code	C GLXMA		C GLXMA			
Crop Scientific Name	Glycine max		Glycine max			
Crop Name	Soybean		Soybean			
Rating Date	Jun-17-2019	Jun-17-2019	Jun-17-2019	Jun-24-2019		
Rating Type	PHYTO	CONTRO	CONTRO	PHYTO		
Rating Unit	%	%	%	%		
Number of Subsamples	1	1	1	1		
Data Entry Date	Aug-26-2019	Aug-26-2019	Aug-26-2019	Aug-26-2019		
Days After First/Last Applic.	31 31	31 31	31 31	38 7		
Days After Emergence	13 DE-1	13 DE-1	13 DE-1	20 DE-1		
Trt Treatment No. Name	Rate Appl Rate Unit Code	1*	2*	3*	4*	5*
1 Untreated Check		0.0 -	0.0 c	0.0 c	0.0 d	0.0 -
2 BOUNDARY TAVIUM ROUNDUP POWERMAX INTACT CLASS ACT RIDION	1.5 pt/a A 56.5 fl oz/a B 32 fl oz/a B 0.5 % v/v B 1 % v/v B	0.0 -	100.0 a	12.5 bc	7.5 ab	100.0 -
3 BROADAXE XC TAVIUM ROUNDUP POWERMAX INTACT CLASS ACT RIDION	25 fl oz/a A 56.5 fl oz/a B 32 fl oz/a B 0.5 % v/v B 1 % v/v B	0.0 -	100.0 a	7.5 bc	10.0 a	100.0 -
4 PREFIX TAVIUM ROUNDUP POWERMAX INTACT CLASS ACT RIDION	1.5 pt/a A 56.5 fl oz/a B 32 fl oz/a B 0.5 % v/v B 1 % v/v B	0.0 -	82.5 b	28.9 b	8.8 a	100.0 -

# North Dakota State University

<b>Tavium Plus VaporGrip Technology Programs in Xtend Soybean</b>	
Trial ID: 19S-PROSPER-SOY-02	Location: PROSPER
Protocol ID: 19S-PROSPER-SOY-02	Investigator (Creator): Dr. Joe Ikley
Project ID: HDC050A4-2019US	Study Director: Joe Ikley
Sponsor Contact: Syngenta - Brett Miller	

Pest Type Pest Code Pest Scientific Name Pest Name		W Weed CHEAL Chenopodium album common lambsquarters	W Weed HELAN Helianthus annuus Common sunflower	W Weed CHEAL Chenopodium album common lambsquarters				
Crop Type, Code Crop Scientific Name Crop Name	C GLXMA Glycine max Soybean			C GLXMA Glycine max Soybean				
Rating Date	Jun-17-2019	Jun-17-2019	Jun-17-2019	Jun-24-2019				
Rating Type	PHYTO	CONTRO	CONTRO	PHYTO				
Rating Unit	%	%	%	%				
Number of Subsamples	1	1	1	1				
Data Entry Date	Aug-26-2019	Aug-26-2019	Aug-26-2019	Aug-26-2019				
Days After First/Last Applic.	31 31	31 31	31 31	38 7				
Days After Emergence	13 DE-1	13 DE-1	13 DE-1	20 DE-1				
Trt No.	Treatment Name	Rate	Appl Code	1*	2*	3*	4*	5*
		Rate Unit						
5	VALOR SX	2 oz/a	A	0.0 -	100.0 a	18.9 bc	3.8 c	100.0 -
	TRICOR	5 oz/a	A					
	XTENDIMAX	22 fl oz/a	B					
	WARRANT	3 pt/a	B					
	ROUNDUP POWERMAX	32 fl oz/a	B					
	INTACT	0.5 % v/v	B					
	CLASS ACT RIDION	1 % v/v	B					
6	ZIDUA PRO	4.5 fl oz/a	A	1.3 -	100.0 a	88.8 a	5.0 bc	100.0 -
	ENGENIA PRO	1 pt/a	B					
	ROUNDUP POWERMAX	32 fl oz/a	B					
	INTACT	0.5 % v/v	B					
	CLASS ACT RIDION	1 % v/v	B					
7	ZIDUA PRO	4.5 fl oz/a	A	2.5 -	100.0 a	86.3 a	5.0 bc	100.0 -
	PROWL H2O	3 pt/a	B					
	ENGENIA	12.8 fl oz/a	B					
	ROUNDUP POWERMAX	32 fl oz/a	B					
	INTACT	0.5 % v/v	B					
	CLASS ACT RIDION	1 % v/v	B					
LSD P=.05		3.21		7.07	15.35	2.24		.
Standard Deviation		2.16		4.76	10.24	1.51		0.00
CV		403.07		5.72	28.94	26.43		0.0
Levene's F		0.867		2.455	1.628	2.167		0.00
Levene's Prob(F)		0.535		0.059	0.194	0.088		.
Skewness		4.1261*		-1.9874*	0.5637	-0.2089		-2.1586*
Kurtosis		17.4011*		2.3446*	-1.4489	-0.8594		2.8592*
Replicate F		0.702		1.000	1.197	3.130		0.000
Replicate Prob(F)		0.5630		0.4155	0.3427	0.0514		1.0000
Treatment F		0.830		245.632	52.598	19.957		0.000
Treatment Prob(F)		0.5622		0.0001	0.0001	0.0001		1.0000

# North Dakota State University

Trial ID: 19S-PROSPER-SOY-02 Protocol ID: 19S-PROSPER-SOY-02 Project ID: HDC050A4-2019US	<b>Tavium Plus VaporGrip Technology Programs in Xtend Soybean</b> Location: PROSPER Investigator (Creator): Dr. Joe Ikley Study Director: Joe Ikley Sponsor Contact: Syngenta - Brett Miller
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Pest Type	W Weed	C GLXMA	W Weed	W Weed
Pest Code	HELAN		CHEAL	HELAN
Pest Scientific Name	Helianthus annuus	Glycine max	Chenopodium album	Helianthus annuus
Pest Name	Common sunflower	Soybean	common lambsquarters	Common sunflower
Crop Type, Code				
Crop Scientific Name				
Crop Name				
Rating Date	Jun-24-2019	Jul-2-2019	Jul-2-2019	Jul-2-2019
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Aug-26-2019	Aug-26-2019	Aug-26-2019	Aug-26-2019
Days After First/Last Applic.	38 7	46 15	46 15	46 15
Days After Emergence	20 DE-1	28 DE-1	28 DE-1	28 DE-1
Trt No.	Treatment	Rate	Appl	
	Name	Rate Unit	Code	
				6*
				7*
				8*
				9*
1	Untreated Check			0.0 b
2	BOUNDARY	1.5 pt/a A		99.3 a
	TAVIUM	56.5 fl oz/a B		
	ROUNDUP POWERMAX	32 fl oz/a B		
	INTACT	0.5 % v/v B		
	CLASS ACT RIDION	1 % v/v B		
3	BROADAXE XC	25 fl oz/a A		99.5 a
	TAVIUM	56.5 fl oz/a B		
	ROUNDUP POWERMAX	32 fl oz/a B		
	INTACT	0.5 % v/v B		
	CLASS ACT RIDION	1 % v/v B		
4	PREFIX	1.5 pt/a A		100.0 a
	TAVIUM	56.5 fl oz/a B		
	ROUNDUP POWERMAX	32 fl oz/a B		
	INTACT	0.5 % v/v B		
	CLASS ACT RIDION	1 % v/v B		

# North Dakota State University

**Tavium Plus VaporGrip Technology Programs in Xtend Soybean**

Trial ID: 19S-PROSPER-SOY-02      Location: PROSPER  
 Protocol ID: 19S-PROSPER-SOY-02      Investigator (Creator): Dr. Joe Ikley  
 Project ID: HDC050A4-2019US      Study Director: Joe Ikley  
 Sponsor Contact: Syngenta - Brett Miller

Pest Type	W Weed	W Weed	W Weed
Pest Code	HELAN	CHEAL	HELAN
Pest Scientific Name	Helianthus annuus	Chenopodium album	Helianthus annuus
Pest Name	Common sunflower	common lambsquarters	Common sunflower
Crop Type, Code		C GLXMA	
Crop Scientific Name		Glycine max	
Crop Name		Soybean	
Rating Date	Jun-24-2019	Jul-2-2019	Jul-2-2019
Rating Type	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%
Number of Subsamples	1	1	1
Data Entry Date	Aug-26-2019	Aug-26-2019	Aug-26-2019
Days After First/Last Applic.	38 7	46 15	46 15
Days After Emergence	20 DE-1	28 DE-1	28 DE-1
Trt Treatment	Rate	Appl	
No. Name	Rate Unit	Code	
			6*
5 VALOR SX	2 oz/a	A	98.3 a
TRICOR	5 oz/a	A	5.0 b
XTENDIMAX	22 fl oz/a	B	8*
WARRANT	3 pt/a	B	100.0 -
ROUNDUP POWERMAX	32 fl oz/a	B	98.5 a
INTACT	0.5 % v/v	B	
CLASS ACT RIDION	1 % v/v	B	
6 ZIDUA PRO	4.5 fl oz/a	A	100.0 a
ENGENIA PRO	1 pt/a	B	5.0 b
ROUNDUP POWERMAX	32 fl oz/a	B	100.0 -
INTACT	0.5 % v/v	B	
CLASS ACT RIDION	1 % v/v	B	96.5 a
7 ZIDUA PRO	4.5 fl oz/a	A	98.5 a
PROWL H20	3 pt/a	B	12.5 a
ENGENIA	12.8 fl oz/a	B	100.0 -
ROUNDUP POWERMAX	32 fl oz/a	B	96.0 a
INTACT	0.5 % v/v	B	
CLASS ACT RIDION	1 % v/v	B	
LSD P=.05	1.92	3.21	1.80
Standard Deviation	1.29	2.16	0.00
CV	1.52	39.01	0.0
Levene's F	1.415	0.867	0.00
Levene's Prob(F)	0.255	0.535	.
Skewness	-2.1528*	1.7749*	-2.1586*
Kurtosis	2.8442*	6.1644*	2.8592*
Replicate F	0.716	0.702	0.000
Replicate Prob(F)	0.5552	0.5630	1.0000
Treatment F	3386.499	11.553	0.000
Treatment Prob(F)	0.0001	0.0001	1.0000

# North Dakota State University

Trial ID: 19S-PROSPER-SOY-02 Protocol ID: 19S-PROSPER-SOY-02 Project ID: HDC050A4-2019US	<b style="text-align: center;">Tavium Plus VaporGrip Technology Programs in Xtend Soybean</b> Location: PROSPER Investigator (Creator): Dr. Joe Ikley Study Director: Joe Ikley Sponsor Contact: Syngenta - Brett Miller
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Pest Type	W Weed	W Weed	W Weed
Pest Code	CHEAL	HELAN	XANST
Pest Scientific Name	Chenopodium album	Helianthus annuus	Xanthium strumarium
Pest Name	common lambsquarters	Common sunflower	Common cocklebur
Crop Type, Code			
Crop Scientific Name			
Crop Name			
Rating Date	Jul-15-2019	Jul-15-2019	Jul-15-2019
Rating Type	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%
Number of Subsamples	1	1	1
Data Entry Date	Aug-26-2019	Aug-26-2019	Aug-26-2019
Days After First/Last Applic.	59 28	59 28	59 28
Days After Emergence	41 DE-1	41 DE-1	41 DE-1
Trt No.	Treatment	Rate	Appl
	Name	Rate Unit	Code
			10*
1	Untreated Check		0.0 -
2	BOUNDARY	1.5 pt/a A	100.0 -
	TAVIUM	56.5 fl oz/a B	
	ROUNDUP POWERMAX	32 fl oz/a B	
	INTACT	0.5 % v/v B	
	CLASS ACT RIDION	1 % v/v B	
3	BROADAXE XC	25 fl oz/a A	100.0 -
	TAVIUM	56.5 fl oz/a B	
	ROUNDUP POWERMAX	32 fl oz/a B	
	INTACT	0.5 % v/v B	
	CLASS ACT RIDION	1 % v/v B	
4	PREFIX	1.5 pt/a A	100.0 -
	TAVIUM	56.5 fl oz/a B	
	ROUNDUP POWERMAX	32 fl oz/a B	
	INTACT	0.5 % v/v B	
	CLASS ACT RIDION	1 % v/v B	
			11*
			0.0 b
			94.8 a
			95.0 a
			95.0 a
			93.5 a
			12*
			0.0 b
			96.0 a
			93.5 a

# North Dakota State University

## Tavium Plus VaporGrip Technology Programs in Xtend Soybean

Trial ID: 19S-PROSPER-SOY-02      Location: PROSPER  
 Protocol ID: 19S-PROSPER-SOY-02      Investigator (Creator): Dr. Joe Ikley  
 Project ID: HDC050A4-2019US      Study Director: Joe Ikley  
 Sponsor Contact: Syngenta - Brett Miller

Pest Type		W Weed	W Weed	W Weed
Pest Code		CHEAL	HELAN	XANST
Pest Scientific Name		Chenopodium album	Helianthus annuus	Xanthium strumarium
Pest Name		common lambsquarters	Common sunflower	Common cocklebur
Crop Type, Code				
Crop Scientific Name				
Crop Name				
Rating Date		Jul-15-2019	Jul-15-2019	Jul-15-2019
Rating Type		CONTRO	CONTRO	CONTRO
Rating Unit		%	%	%
Number of Subsamples		1	1	1
Data Entry Date		Aug-26-2019	Aug-26-2019	Aug-26-2019
Days After First/Last Applic.		59 28	59 28	59 28
Days After Emergence		41 DE-1	41 DE-1	41 DE-1
Trt No.	Treatment Name	Rate	Appl Code	
		Rate Unit		
				10*
5	VALOR SX	2 oz/a	A	100.0 -
	TRICOR	5 oz/a	A	
	XTENDIMAX	22 fl oz/a	B	
	WARRANT	3 pt/a	B	
	ROUNDUP POWERMAX	32 fl oz/a	B	
	INTACT	0.5 % v/v	B	
	CLASS ACT RIDION	1 % v/v	B	
6	ZIDUA PRO	4.5 fl oz/a	A	100.0 -
	ENGENIA PRO	1 pt/a	B	
	ROUNDUP POWERMAX	32 fl oz/a	B	
	INTACT	0.5 % v/v	B	
	CLASS ACT RIDION	1 % v/v	B	
7	ZIDUA PRO	4.5 fl oz/a	A	100.0 -
	PROWL H20	3 pt/a	B	
	ENGENIA	12.8 fl oz/a	B	
	ROUNDUP POWERMAX	32 fl oz/a	B	
	INTACT	0.5 % v/v	B	
	CLASS ACT RIDION	1 % v/v	B	
LSD P=.05				2.47
Standard Deviation		0.00		1.67
CV		0.0		2.06
Levene's F		0.00		5.458
Levene's Prob(F)		.		0.002*
Skewness		-2.1586*		-2.1462*
Kurtosis		2.8592*		2.8275*
Replicate F		0.000		1.901
Replicate Prob(F)		1.0000		0.1656
Treatment F		0.000		1842.545
Treatment Prob(F)		1.0000		0.0001

## North Dakota State University

Trial ID: 19S-PROSPER-SOY-02 Protocol ID: 19S-PROSPER-SOY-02 Project ID: HDC050A4-2019US	<b style="text-align: center;">Tavium Plus VaporGrip Technology Programs in Xtend Soybean</b> Location: PROSPER Investigator (Creator): Dr. Joe Ikley Study Director: Joe Ikley Sponsor Contact: Syngenta - Brett Miller
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Pest Type

W, Weed = Weed or volunteer crop

Pest Code

CHEAL, Chenopodium album, common lambsquarters = US

HELAN, Helianthus annuus, Common sunflower = US

XANST, Xanthium strumarium, Common cocklebur = US

Crop Type, Code

C = EPPO species (Bayer) codes

GLXMA, BSOY, Glycine max, Soybean = US

Rating Type

CONTRO = control / burndown or knockdown

Rating Unit

% = percent

### Trial Comments

General comments: Crops and weeds took almost 3 weeks to emerge due to cold, wet spell after planting. The growing season was abnormal with excessive rain in the second half of June and most of July.



# North Dakota State University

Trial ID: 19S-PROSPER-SOY-05 Protocol ID: 19S-PROSPER-SOY-05 Project ID: NA19P2E001H	<b>Weed Control Programs in Enlist Soybean</b> Location: PROSPER Investigator (Creator): Dr. Joe Ikley Study Director: Joe Ikley Sponsor Contact: Corteva - Dave Johnson
--	--

## General Trial Information

**Study Director:** Joe Ikley

**Investigator:** Dr. Joe Ikley

**Trial Status:** E established

**Trial Status Date:** Jun-7-2019

**ARM Trial Created On:** May-9-2019

**Last Changed By:** Dr. Joe Ikley

**Protocol Revision Date:** May-9-2019

**Conducted Under GLP:** No

**Conducted Under GEP:** No

## Contacts

**Role:** STYDIR study director

**Study Director:** Joe Ikley

**Role:** INVEST investigator

**Investigator:** Dr. Joe Ikley

**Role:** SPONSR sponsor

**Sponsor:** Corteva - Dave Johnson

## Site and Design

**Treated Plot Width:** 6.67 FT

**Treated Plot Length:** 30 FT

**Treated Plot Area:** 200.1 FT<sup>2</sup> **Treatments:** 9

**Replications:** 4

**Study Design:** RACOB L Randomized Complete Block (RCB)

## Soil Description

**Description Name:** Prosper

**% Sand:** 24.7 **% OM:** 4

**Texture:** SIL silt loam

**% Silt:** 53.3

**pH:** 7.3

**Soil Name:** Kindred-Bearden Silty Clay Loam

**% Clay:** 22

**CEC:** 18.5

## Application Description

	A			B		
<b>Application Date</b>	May-29-2019			Jun-26-2019		
<b>Appl. Start Time</b>	4:30 PM			8:11 AM		
<b>Appl. Stop Time</b>	5:00 PM			8:29 AM		
<b>Interval to Prev. Appl.</b>				28 DAYS		
<b>Application Method</b>	SPRAY			SPRAY		
<b>Application Timing</b>	PREEM			12		
<b>Application Placement</b>	SOIL			BROFOL		
<b>Applied By</b>	Ikley, J.			Haugrud, N.		
<b>Appl. Entry Date</b>	Jun-7-2019			Jul-18-2019		
<b>Air Temperature Start, Stop</b>	82	83	F	72	74	F
<b>% Relative Humidity Start, Stop</b>	25	25		62	64	
<b>Wind Velocity+Dir. Start</b>	6	MPH	NNE	6	MPH	W
<b>Wind Velocity+Dir. Stop</b>	6	MPH	NNE	8	MPH	W
<b>Wind Velocity+Dir. Max</b>	8	MPH	NNE	10	MPH	W
<b>Wet Leaves (Y/N)</b>	N no			N no		
<b>Soil Temperature</b>	69		F	70		F
<b>Soil Moisture</b>	GOOD			SLIWET		
<b>Soil Surface Condition</b>	COURSE			FINE		
<b>% Cloud Cover</b>	30			15		

# North Dakota State University

Trial ID: 19S-PROSPER-SOY-05 Protocol ID: 19S-PROSPER-SOY-05 Project ID: NA19P2E001H	<b>Weed Control Programs in Enlist Soybean</b> Location: PROSPER Investigator (Creator): Dr. Joe Ikley Study Director: Joe Ikley Sponsor Contact: Corteva - Dave Johnson
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Application Equipment				
	A		B	
Appl. Equipment	Mjолnir		Narsil	
Equipment Type	BACCAI		BACCAI	
Operation Pressure	28	PSI	28	PSI
Nozzle Type	TTI		AIXR	
Nozzle Size	11002		11002	
Nozzle Spacing	20	IN	20	IN
Boom Length	6.67	FT	6.67	FT
Boom Height	18	IN	18	IN
Ground Speed	3	MPH	3	MPH
Carrier	WATER		WATER	
Application Amount	15	GAL/AC	15	GAL/AC
Mix Size	1119	mL	1119	mL
Propellant	COMCO2		COMCO2	

Context	Date	By	Notes
STATUS	May-9-2019	Dr. Joe Ikley	Automatically added by ARM: Trial Status updated to 'S' during trial creation.
STATUS	Jun-7-2019	Dr. Joe Ikley	Automatically added by ARM: Trial Status updated to 'E' when Application Date entered.

Pest Type			W Weed	W Weed	W Weed	W Weed
Pest Code			XANST	CHEAL	POLCO	AMBEL
Pest Scientific Name			Xanthium strumarium	Chenopodium album	Fallopia convolvulus	Ambrosia artemisiifolia
Pest Name			Common cocklebur	common lambsquarters	wild buckwheat	Common ragweed
Rating Date	Jun-27-2019		Jun-27-2019	Jun-27-2019	Jun-27-2019	Jun-27-2019
Rating Type	PHYTO		CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%		%	%	%	%
Number of Subsamples	1		1	1	1	1
Data Entry Date	Jul-31-2019		Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019
Days After First/Last Applic.	29 1		29 1	29 1	29 1	29 1
Days After Emergence	20 DE-1		20 DE-1	20 DE-1	20 DE-1	20 DE-1
Trt Treatment	Rate	Appl				
No. Name	Rate Unit	Code	1*	2*	3*	4*
1 Untreated Check			0.0 -	0.0 -	0.0 -	0.0 -
2 SONIC	4.5 oz/a	A	0.0 -	0.0 -	0.0 -	0.0 -
DURANGO DMA	32 fl oz/a	B				
N-PAK AMS	2.5 % v/v	B				
3 SONIC	4.5 oz/a	A	0.0 -	0.0 -	0.0 -	0.0 -
ENLIST DUO	56 fl oz/a	B				
N-PAK AMS	2.5 % v/v	B				
4 SONIC	4.5 oz/a	A	0.0 -	0.0 -	0.0 -	0.0 -
ENLIST DUO	75 fl oz/a	B				
N-PAK AMS	2.5 % v/v	B				
5 SONIC	4.5 oz/a	A	0.0 -	0.0 -	0.0 -	0.0 -
ENLIST ONE	24 fl oz/a	B				
DURANGO DMA	24 fl oz/a	B				
N-PAK AMS	2.5 % v/v	B				
6 SONIC	4.5 oz/a	A	0.0 -	0.0 -	0.0 -	0.0 -
ENLIST ONE	32 fl oz/a	B				
DURANGO DMA	32 fl oz/a	B				
N-PAK AMS	2.5 % v/v	B				
7 SONIC	4.5 oz/a	A	0.0 -	0.0 -	0.0 -	0.0 -
LIBERTY 280 SL	29 fl oz/a	B				
N-PAK AMS	2.5 % v/v	B				

# North Dakota State University

<b>Weed Control Programs in Enlist Soybean</b>	
Trial ID: 19S-PROSPER-SOY-05	Location: PROSPER
Protocol ID: 19S-PROSPER-SOY-05	Investigator (Creator): Dr. Joe Ikley
Project ID: NA19P2E001H	Study Director: Joe Ikley
Sponsor Contact: Corteva - Dave Johnson	

Pest Type Pest Code Pest Scientific Name Pest Name		W Weed XANST Xanthium strumarium Common cocklebur	W Weed CHEAL Chenopodium album common lambsquarters	W Weed POLCO Fallopia convolvulus wild buckwheat	W Weed AMBEL Ambrosia artemisiifolia Common ragweed			
Rating Date	Jun-27-2019	Jun-27-2019	Jun-27-2019	Jun-27-2019	Jun-27-2019			
Rating Type	PHYTO	CONTRO	CONTRO	CONTRO	CONTRO			
Rating Unit	%	%	%	%	%			
Number of Subsamples	1	1	1	1	1			
Data Entry Date	Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019			
Days After First/Last Applic.	29 1	29 1	29 1	29 1	29 1			
Days After Emergence	20 DE-1	20 DE-1	20 DE-1	20 DE-1	20 DE-1			
Trt No.	Treatment Name	Rate	Appl Code	1*	2*	3*	4*	5*
8	SONIC	4.5 oz/a	A	0.0 -	0.0 -	0.0 -	0.0 -	0.0 -
	ENLIST ONE	24 fl oz/a	B					
	LIBERTY 280 SL	29 fl oz/a	B					
	N-PAK AMS	2.5 % v/v	B					
9	SONIC	4.5 oz/a	A	0.0 -	0.0 -	0.0 -	0.0 -	0.0 -
	ENLIST ONE	32 fl oz/a	B					
	LIBERTY 280 SL	29 fl oz/a	B					
	N-PAK AMS	2.5 % v/v	B					
LSD P=.05								
Standard Deviation	0.00	0.00		0.00	0.00	0.00	0.00	0.00
CV	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Levene's F	0.00	0.00		0.00	0.00	0.00	0.00	0.00
Levene's Prob(F)	.	.		.	.	.	.	.
Skewness	.	.		.	.	.	.	.
Kurtosis	.	.		.	.	.	.	.
Replicate F	0.000	0.000		0.000	0.000	0.000	0.000	0.000
Replicate Prob(F)	1.0000	1.0000		1.0000	1.0000	1.0000	1.0000	1.0000
Treatment F	0.000	0.000		0.000	0.000	0.000	0.000	0.000
Treatment Prob(F)	1.0000	1.0000		1.0000	1.0000	1.0000	1.0000	1.0000

# North Dakota State University

## Weed Control Programs in Enlist Soybean

Trial ID: 19S-PROSPER-SOY-05	Location: PROSPER
Protocol ID: 19S-PROSPER-SOY-05	Investigator (Creator): Dr. Joe Ikley
Project ID: NA19P2E001H	Study Director: Joe Ikley
	Sponsor Contact: Corteva - Dave Johnson

Pest Type		W Weed	W Weed	W Weed	W Weed		
Pest Code		XANST	CHEAL	POLCO	AMBEL		
Pest Scientific Name		Xanthium strumarium	Chenopodium album	Fallopia convolvulus	Ambrosia artemisiifolia		
Pest Name		Common cocklebur	common lambsquarters	wild buckwheat	Common ragweed		
Rating Date	Jul-11-2019	Jul-11-2019	Jul-11-2019	Jul-11-2019	Jul-11-2019		
Rating Type	PHYTO	CONTRO	CONTRO	CONTRO	CONTRO		
Rating Unit	%	%	%	%	%		
Number of Subsamples	1	1	1	1	1		
Data Entry Date	Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019		
Days After First/Last Applic.	43 15	43 15	43 15	43 15	43 15		
Days After Emergence	34 DE-1	34 DE-1	34 DE-1	34 DE-1	34 DE-1		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	6*	7*	8*	9*	10*
1 Untreated Check			0.0 -	0.0 c	0.0 c	0.0 c	0.0 d
2 SONIC	4.5 oz/a A		0.0 -	99.5 a	100.0 a	99.8 a	92.5 b
DURANGO DMA	32 fl oz/a B						
N-PAK AMS	2.5 % v/v B						
3 SONIC	4.5 oz/a A		0.0 -	99.5 a	100.0 a	99.5 a	96.0 a
ENLIST DUO	56 fl oz/a B						
N-PAK AMS	2.5 % v/v B						
4 SONIC	4.5 oz/a A		0.0 -	99.8 a	100.0 a	99.3 a	99.0 a
ENLIST DUO	75 fl oz/a B						
N-PAK AMS	2.5 % v/v B						
5 SONIC	4.5 oz/a A		0.0 -	99.5 a	100.0 a	99.5 a	99.0 a
ENLIST ONE	24 fl oz/a B						
DURANGO DMA	24 fl oz/a B						
N-PAK AMS	2.5 % v/v B						
6 SONIC	4.5 oz/a A		0.0 -	99.5 a	100.0 a	99.5 a	99.3 a
ENLIST ONE	32 fl oz/a B						
DURANGO DMA	32 fl oz/a B						
N-PAK AMS	2.5 % v/v B						
7 SONIC	4.5 oz/a A		0.0 -	87.5 b	93.8 b	92.5 b	80.0 c
LIBERTY 280 SL	29 fl oz/a B						
N-PAK AMS	2.5 % v/v B						

# North Dakota State University

<b>Weed Control Programs in Enlist Soybean</b>	
Trial ID: 19S-PROSPER-SOY-05	Location: PROSPER
Protocol ID: 19S-PROSPER-SOY-05	Investigator (Creator): Dr. Joe Ikley
Project ID: NA19P2E001H	Study Director: Joe Ikley
Sponsor Contact: Corteva - Dave Johnson	

Pest Type		W Weed	W Weed	W Weed	W Weed
Pest Code		XANST	CHEAL	POLCO	AMBEL
Pest Scientific Name		Xanthium strumarium	Chenopodium album	Fallopia convolvulus	Ambrosia artemisiifolia
Pest Name		Common cocklebur	common lambsquarters	wild buckwheat	Common ragweed
Rating Date	Jul-11-2019	Jul-11-2019	Jul-11-2019	Jul-11-2019	Jul-11-2019
Rating Type	PHYTO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Data Entry Date	Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019
Days After First/Last Applic.	43 15	43 15	43 15	43 15	43 15
Days After Emergence	34 DE-1	34 DE-1	34 DE-1	34 DE-1	34 DE-1
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	6*	7*	8*
			9*	10*	
8 SONIC	4.5 oz/a	A	0.0 -	99.3 a	99.3 a
ENLIST ONE	24 fl oz/a	B			
LIBERTY 280 SL	29 fl oz/a	B			
N-PAK AMS	2.5 % v/v	B			
9 SONIC	4.5 oz/a	A	0.0 -	100.0 a	99.5 a
ENLIST ONE	32 fl oz/a	B			
LIBERTY 280 SL	29 fl oz/a	B			
N-PAK AMS	2.5 % v/v	B			
LSD P=.05	.		2.48	2.31	2.48
Standard Deviation	0.00		1.70	1.58	1.70
CV	0.0		1.95	1.79	1.94
Levene's F	0.00		0.811	8.375	0.765
Levene's Prob(F)	.		0.599	0.001*	0.636
Skewness	.		-2.5065*	-2.5564*	-2.5492*
Kurtosis	.		4.6783*	4.8561*	4.8322*
Replicate F	0.000		1.296	1.676	1.367
Replicate Prob(F)	1.0000		0.2986	0.1988	0.2765
Treatment F	0.000		1502.755	1752.793	1503.716
Treatment Prob(F)	1.0000		0.0001	0.0001	0.0001

# North Dakota State University

**Weed Control Programs in Enlist Soybean**

Trial ID: 19S-PROSPER-SOY-05      Location: PROSPER  
 Protocol ID: 19S-PROSPER-SOY-05      Investigator (Creator): Dr. Joe Ikley  
 Project ID: NA19P2E001H      Study Director: Joe Ikley  
 Sponsor Contact: Corteva - Dave Johnson

Pest Type		W Weed	W Weed	W Weed	W Weed		
Pest Code		XANST	CHEAL	POLCO	AMBEL		
Pest Scientific Name		Xanthium strumarium	Chenopodium album	Fallopia convolvulus	Ambrosia artemisiifolia		
Pest Name		Common cocklebur	common lambsquarters	wild buckwheat	Common ragweed		
Rating Date	Jul-27-2019	Jul-27-2019	Jul-27-2019	Jul-27-2019	Jul-27-2019		
Rating Type	PHYTO	CONTRO	CONTRO	CONTRO	CONTRO		
Rating Unit	%	%	%	%	%		
Number of Subsamples	1	1	1	1	1		
Data Entry Date	Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019		
Days After First/Last Applic.	59 31	59 31	59 31	59 31	59 31		
Days After Emergence	50 DE-1	50 DE-1	50 DE-1	50 DE-1	50 DE-1		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	11*	12*	13*	14*	15*
1 Untreated Check			0.0 -	0.0 c	0.0 b	0.0 c	0.0 d
2 SONIC	4.5 oz/a A		0.0 -	98.8 a	100.0 a	96.8 a	77.5 b
DURANGO DMA	32 fl oz/a B						
N-PAK AMS	2.5 % v/v B						
3 SONIC	4.5 oz/a A		0.0 -	98.8 a	100.0 a	99.3 a	93.3 a
ENLIST DUO	56 fl oz/a B						
N-PAK AMS	2.5 % v/v B						
4 SONIC	4.5 oz/a A		0.0 -	98.8 a	100.0 a	99.3 a	95.8 a
ENLIST DUO	75 fl oz/a B						
N-PAK AMS	2.5 % v/v B						
5 SONIC	4.5 oz/a A		0.0 -	97.8 a	100.0 a	99.3 a	97.3 a
ENLIST ONE	24 fl oz/a B						
DURANGO DMA	24 fl oz/a B						
N-PAK AMS	2.5 % v/v B						
6 SONIC	4.5 oz/a A		0.0 -	96.3 a	100.0 a	99.3 a	97.0 a
ENLIST ONE	32 fl oz/a B						
DURANGO DMA	32 fl oz/a B						
N-PAK AMS	2.5 % v/v B						
7 SONIC	4.5 oz/a A		0.0 -	90.0 b	97.5 a	91.3 b	60.0 c
LIBERTY 280 SL	29 fl oz/a B						
N-PAK AMS	2.5 % v/v B						

# North Dakota State University

Trial ID: 19S-PROSPER-SOY-05 Protocol ID: 19S-PROSPER-SOY-05 Project ID: NA19P2E001H	<b>Weed Control Programs in Enlist Soybean</b> Location: PROSPER Investigator (Creator): Dr. Joe Ikley Study Director: Joe Ikley Sponsor Contact: Corteva - Dave Johnson
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Pest Type		W Weed	W Weed	W Weed	W Weed		
Pest Code		XANST	CHEAL	POLCO	AMBEL		
Pest Scientific Name		Xanthium strumarium	Chenopodium album	Fallopia convolvulus	Ambrosia artemisiifolia		
Pest Name		Common cocklebur	common lambsquarters	wild buckwheat	Common ragweed		
Rating Date	Jul-27-2019	Jul-27-2019	Jul-27-2019	Jul-27-2019	Jul-27-2019		
Rating Type	PHYTO	CONTRO	CONTRO	CONTRO	CONTRO		
Rating Unit	%	%	%	%	%		
Number of Subsamples	1	1	1	1	1		
Data Entry Date	Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019	Jul-31-2019		
Days After First/Last Applic.	59 31	59 31	59 31	59 31	59 31		
Days After Emergence	50 DE-1	50 DE-1	50 DE-1	50 DE-1	50 DE-1		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	11*	12*	13*	14*	15*
8 SONIC	4.5 oz/a	A	0.0 -	100.0 a	99.5 a	99.5 a	93.3 a
ENLIST ONE	24 fl oz/a	B					
LIBERTY 280 SL	29 fl oz/a	B					
N-PAK AMS	2.5 % v/v	B					
9 SONIC	4.5 oz/a	A	0.0 -	99.5 a	100.0 a	99.8 a	98.3 a
ENLIST ONE	32 fl oz/a	B					
LIBERTY 280 SL	29 fl oz/a	B					
N-PAK AMS	2.5 % v/v	B					
LSD P=.05	.		4.91	2.50	4.42	5.53	
Standard Deviation	0.00		3.36	1.71	3.03	3.79	
CV	0.0		3.88	1.93	3.48	4.79	
Levene's F	0.00		1.944	0.952	0.731	0.926	
Levene's Prob(F)	.		0.094	0.492	0.664	0.511	
Skewness	.		-2.5057*	-2.5706*	-2.5225*	-1.9117*	
Kurtosis	.		4.6808*	4.9034*	4.7319*	2.5933*	
Replicate F	0.000		0.580	0.858	0.576	0.507	
Replicate Prob(F)	1.0000		0.6341	0.4762	0.6365	0.6811	
Treatment F	0.000		376.999	1503.776	468.318	289.429	
Treatment Prob(F)	1.0000		0.0001	0.0001	0.0001	0.0001	

## North Dakota State University

Trial ID: 19S-PROSPER-SOY-05 Protocol ID: 19S-PROSPER-SOY-05 Project ID: NA19P2E001H	<p style="text-align: center;"><b>Weed Control Programs in Enlist Soybean</b></p> Location: PROSPER Investigator (Creator): Dr. Joe Ikley Study Director: Joe Ikley Sponsor Contact: Corteva - Dave Johnson
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Pest Type

W, Weed = Weed or volunteer crop

Pest Code

XANST, Xanthium strumarium, Common cocklebur = US  
 CHEAL, Chenopodium album, common lambsquarters = US  
 POLCO, Fallopia convolvulus, wild buckwheat = US  
 AMBEL, Ambrosia artemisiifolia, Common ragweed = US

Rating Type

CONTRO = control / burndown or knockdown

Rating Unit

% = percent

### Trial Comments

Weather comments: The lack of rain in the time period after planting made the preemergence treatments show little to no effect. The growing season was abnormal with excessive rain the second half of June and most of July. The first two replications of this trial were under water or saturated for a week in early July. This soybean cultivar was significantly affected by IDC in the early growth stages.



## North Dakota State University

### Liberty Plus Glyphosate Combinations in LLGT27 Soybean

Trial ID: 19S-PROSPER-SOY-17      Location: PROSPER  
 Protocol ID: 19S-PROSPER-SOY-17    Investigator (Creator): Dr. Joe Ikley  
 Project ID: MKD-H-2019-US-D41      Study Director: Joe Ikley  
    Sponsor Contact: BASF - Ken Deibert

#### General Trial Information

**Study Director:** Joe Ikley

**Investigator:** Dr. Joe Ikley

**Trial Status:** E      established

**Trial Status Date:** Jun-7-2019

**Last Changed By:** Dr. Joe Ikley

**ARM Trial Created On:** May-10-2019

**Protocol Revision Date:** May-10-2019

**Conducted Under GLP:** No

**Conducted Under GEP:** No

#### Contacts

**Role:** STYDIR study director

**Study Director:** Joe Ikley

**Role:** INVEST investigator

**Investigator:** Dr. Joe Ikley

**Role:** SPONSR sponsor

**Sponsor:** BASF - Ken Deibert

#### Site and Design

**Treated Plot Width:** 6.67 FT

**Treated Plot Length:** 30 FT

**Treated Plot Area:** 200.1 FT<sup>2</sup>    **Treatments:** 9

**Replications:** 4

**Study Design:** RACOB Randomized Complete Block (RCB)

#### Soil Description

**Description Name:** Prosper

**% Sand:** 24.7      **% OM:** 4

**Texture:** SIL

silt loam

**% Silt:** 53.3

**pH:** 7.3

**Soil Name:** Kindred-Bearden Silty Clay Loam

**% Clay:** 22

**CEC:** 18.5

#### Application Description

	A			B		
<b>Application Date</b>	May-29-2019			Jun-19-2019		
<b>Appl. Start Time</b>	4:00 PM			8:30 AM		
<b>Appl. Stop Time</b>	4:30 PM			8:50 AM		
<b>Application Method</b>	SPRAY			SPRAY		
<b>Application Timing</b>	PREEM			3" WEEDS		
<b>Application Placement</b>	BROSOI			BROFOL		
<b>Applied By</b>	Haugrud, N.			Haugrud, N.		
<b>Appl. Entry Date</b>	Jun-7-2019			Jun-18-2019		
<b>Air Temperature Start, Stop</b>	82	82	F	68.5	69	F
<b>% Relative Humidity Start, Stop</b>	25	25		53.8	54.1	
<b>Wind Velocity+Dir. Start</b>	6	MPH	NNE	5.3	MPH	E
<b>Wind Velocity+Dir. Stop</b>	6	MPH	NNE	5.1	MPH	E
<b>Wind Velocity+Dir. Max</b>	8	MPH	NNE	7.7	MPH	E
<b>Wet Leaves (Y/N)</b>	N no			N no		
<b>Soil Temperature</b>	66		F	65		F
<b>Soil Moisture</b>	GOOD			GOOD		
<b>Soil Surface Condition</b>	COURSE			COURSE		
<b>% Cloud Cover</b>	30			75		

## North Dakota State University

### Liberty Plus Glyphosate Combinations in LLGT27 Soybean

Trial ID: 19S-PROSPER-SOY-17      Location: PROSPER  
 Protocol ID: 19S-PROSPER-SOY-17      Investigator (Creator): Dr. Joe Ikley  
 Project ID: MKD-H-2019-US-D41      Study Director: Joe Ikley  
 Sponsor Contact: BASF - Ken Deibert

#### Application Equipment

	A	B
Appl. Equipment	Narsil	Narsil
Equipment Type	BACCAI	BACCAI
Operation Pressure	28 PSI	28 PSI
Nozzle Type	TTI	TEEJTU
Nozzle Size	11002	11002
Nozzle Spacing	20 IN	20 IN
Boom Length	6.67 FT	6.67 FT
Boom Height	18 IN	18 IN
Ground Speed	3 MPH	3 MPH
Carrier	WATER	WATER
Application Amount	15 GAL/AC	15 GAL/AC
Mix Size	1119 mL	1119 mL
Propellant	COMCO2	COMCO2

Context	Date	By	Notes
STATUS	May-10-2019	Dr. Joe Ikley	Automatically added by ARM: Trial Status updated to 'S' during trial creation.
STATUS	Jun-7-2019	Dr. Joe Ikley	Automatically added by ARM: Trial Status updated to 'E' when Application Date entered.

Pest Type	Pest Code	Pest Scientific Name	Pest Name	Crop Type, Code	Crop Scientific Name	W Weed AVEFA Avena fatua Wild oat	W Weed AVEFA Avena fatua Wild oat	W Weed AVEFA Avena fatua Wild oat	C GLXMA Glycine max	
Soybean	Jun-27-2019	PHYTO	CONTRO	PHYTO	CONTRO	PHYTO	CONTRO	PHYTO	CONTRO	
Rating Date	Jun-27-2019	%	%	%	%	%	%	%	%	
Rating Type	PHYTO	1	1	1	1	1	1	1	1	
Rating Unit	%	1	1	1	1	1	1	1	1	
Number of Subsamples	1	1	1	1	1	1	1	1	1	
Data Entry Date	Aug-8-2019	Aug-8-2019	Aug-8-2019	Aug-8-2019	Aug-8-2019	Aug-8-2019	Aug-8-2019	Aug-8-2019	Aug-8-2019	
Days After First/Last Applic.	29 8	29 8	34 13	34 13	49 28	49 28	49 28	62 41	62 41	
Days After Emergence	20 DE-1	20 DE-1	25 DE-1	25 DE-1	40 DE-1	40 DE-1	40 DE-1	53 DE-1	53 DE-1	
Trt Treatment No. Name	Rate	Appl Rate Unit	Code	1*	2*	3*	4*	5*	6*	7*
1 Untreated Check				0.0 -	0.0 c	0.0 -	0.0 d	0.0 -	0.0 d	0.0 -
2 VERDICT LIBERTY 280 SL N-PAK AMS	5 fl oz/a A 32 fl oz/a B 2.5 % v/v B			0.0 -	77.5 b	0.0 -	47.5 c	0.0 -	13.8 c	0.0 -
3 VERDICT ROUNDUP POWERMAX N-PAK AMS	5 fl oz/a A 32 fl oz/a B 2.5 % v/v B			0.0 -	93.8 a	0.0 -	72.5 ab	0.0 -	30.0 bc	0.0 -
4 VERDICT LIBERTY 280 SL ROUNDUP POWERMAX N-PAK AMS	5 fl oz/a A 32 fl oz/a B 32 fl oz/a B 2.5 % v/v B			0.0 -	85.0 ab	0.0 -	62.5 bc	0.0 -	28.8 bc	0.0 -
5 VERDICT LIBERTY 280 SL SELECT MAX N-PAK AMS	5 fl oz/a A 32 fl oz/a B 6 fl oz/a B 2.5 % v/v B			0.0 -	92.0 a	0.0 -	81.3 ab	0.0 -	42.5 b	0.0 -

## North Dakota State University

### Liberty Plus Glyphosate Combinations in LLGT27 Soybean

Trial ID: 19S-PROSPER-SOY-17      Location: PROSPER  
 Protocol ID: 19S-PROSPER-SOY-17      Investigator (Creator): Dr. Joe Ikley  
 Project ID: MKD-H-2019-US-D41      Study Director: Joe Ikley  
 Sponsor Contact: BASF - Ken Deibert

Pest Type		W Weed		W Weed		W Weed			
Pest Code		AVEFA		AVEFA		AVEFA			
Pest Scientific Name		Avena fatua		Avena fatua		Avena fatua			
Pest Name		Wild oat		Wild oat		Wild oat			
Crop Type, Code	C GLXMA		C GLXMA		C GLXMA		C GLXMA		
Crop Scientific Name	Glycine max		Glycine max		Glycine max		Glycine max		
Crop Name	Soybean		Soybean		Soybean		Soybean		
Rating Date	Jun-27-2019	Jun-27-2019	Jul-2-2019	Jul-2-2019	Jul-17-2019	Jul-17-2019	Jul-30-2019		
Rating Type	PHYTO	CONTRO	PHYTO	CONTRO	PHYTO	CONTRO	PHYTO		
Rating Unit	%	%	%	%	%	%	%		
Number of Subsamples	1	1	1	1	1	1	1		
Data Entry Date	Aug-8-2019	Aug-8-2019	Aug-8-2019	Aug-8-2019	Aug-8-2019	Aug-8-2019	Aug-8-2019		
Days After First/Last Applic.	29 8	29 8	34 13	34 13	49 28	49 28	62 41		
Days After Emergence	20 DE-1	20 DE-1	25 DE-1	25 DE-1	40 DE-1	40 DE-1	53 DE-1		
Trt Treatment	Rate	Appl							
No. Name	Rate Unit	Code	1*	2*	3*	4*	5*	6*	7*
6 VERDICT	5 fl oz/a A		0.0 -	93.8 a	0.0 -	80.0 ab	0.0 -	42.5 b	0.0 -
LIBERTY 280 SL	32 fl oz/a B								
ROUNDUP POWERMAX	32 fl oz/a B								
OUTLOOK	10 fl oz/a B								
N-PAK AMS	2.5 % v/v B								
7 VERDICT	5 fl oz/a A		0.0 -	81.3 b	0.0 -	62.5 bc	0.0 -	25.0 bc	0.0 -
LIBERTY 280 SL	32 fl oz/a B								
ROUNDUP POWERMAX	22 fl oz/a B								
N-PAK AMS	2.5 % v/v B								
8 VERDICT	5 fl oz/a A		0.0 -	86.3 ab	0.0 -	67.5 b	0.0 -	31.3 bc	0.0 -
LIBERTY 280 SL	32 fl oz/a B								
ROUNDUP POWERMAX	16 fl oz/a B								
N-PAK AMS	2.5 % v/v B								
9 VERDICT	5 fl oz/a A		0.8 -	93.3 a	0.0 -	90.0 a	0.0 -	63.8 a	0.0 -
LIBERTY 280 SL	32 fl oz/a B								
SELECT MAX	6 fl oz/a B								
OUTLOOK	10 fl oz/a B								
N-PAK AMS	2.5 % v/v B								
LSD P=.05			0.73	7.24	.	14.03	.	13.10	.
Standard Deviation			0.50	4.96	0.00	9.62	0.00	8.98	0.00
CV			600.0	6.35	0.0	15.35	0.0	29.11	0.0
Levene's F			1.00	1.609	0.00	2.256	0.00	1.146	0.00
Levene's Prob(F)			0.459	0.169	.	0.054	.	0.366	.
Skewness			6.0*	-2.2986*	.	-1.3671*	.	0.3805	.
Kurtosis			36.0*	4.0086*	.	1.1682	.	0.0344	.
Replicate F			1.000	1.420	0.000	0.628	0.000	0.586	0.000
Replicate Prob(F)			0.4098	0.2613	1.0000	0.6038	1.0000	0.6299	1.0000
Treatment F			1.000	145.149	0.000	30.657	0.000	16.371	0.000
Treatment Prob(F)			0.4613	0.0001	1.0000	0.0001	1.0000	0.0001	1.0000

# North Dakota State University

## Liberty Plus Glyphosate Combinations in LLGT27 Soybean

Trial ID: 19S-PROSPER-SOY-17	Location: PROSPER
Protocol ID: 19S-PROSPER-SOY-17	Investigator (Creator): Dr. Joe Ikley
Project ID: MKD-H-2019-US-D41	Study Director: Joe Ikley
	Sponsor Contact: BASF - Ken Deibert

Pest Type	W Weed		
Pest Code	AVEFA		
Pest Scientific Name	Avena fatua		
Pest Name	Wild oat		
Crop Type, Code			
Crop Scientific Name			
Crop Name			
Rating Date	Jul-30-2019		
Rating Type	CONTRO		
Rating Unit	%		
Number of Subsamples	1		
Data Entry Date	Aug-8-2019		
Days After First/Last Applic.	62 41		
Days After Emergence	53 DE-1		
Trt No.	Treatment Name	Rate Unit	Appl Code
1	Untreated Check		8*
2	VERDICT	5 fl oz/a A	3.8 cd
	LIBERTY 280 SL	32 fl oz/a B	
	N-PAK AMS	2.5 % v/v B	
3	VERDICT	5 fl oz/a A	15.0 bcd
	ROUNDUP POWERMAX	32 fl oz/a B	
	N-PAK AMS	2.5 % v/v B	
4	VERDICT	5 fl oz/a A	17.5 bc
	LIBERTY 280 SL	32 fl oz/a B	
	ROUNDUP POWERMAX	32 fl oz/a B	
	N-PAK AMS	2.5 % v/v B	
5	VERDICT	5 fl oz/a A	23.8 b
	LIBERTY 280 SL	32 fl oz/a B	
	SELECT MAX	6 fl oz/a B	
	N-PAK AMS	2.5 % v/v B	

## North Dakota State University

### Liberty Plus Glyphosate Combinations in LLGT27 Soybean

Trial ID: 19S-PROSPER-SOY-17	Location: PROSPER
Protocol ID: 19S-PROSPER-SOY-17	Investigator (Creator): Dr. Joe Ikley
Project ID: MKD-H-2019-US-D41	Study Director: Joe Ikley
	Sponsor Contact: BASF - Ken Deibert

Pest Type	W Weed	
Pest Code	AVEFA	
Pest Scientific Name	Avena fatua	
Pest Name	Wild oat	
Crop Type, Code		
Crop Scientific Name		
Crop Name		
Rating Date	Jul-30-2019	
Rating Type	CONTRO	
Rating Unit	%	
Number of Subsamples	1	
Data Entry Date	Aug-8-2019	
Days After First/Last Applic.	62 41	
Days After Emergence	53 DE-1	
Trt Treatment	Rate Appl	
No. Name	Rate Unit Code	8*
6 VERDICT	5 fl oz/a A	21.3 b
LIBERTY 280 SL	32 fl oz/a B	
ROUNDUP POWERMAX	32 fl oz/a B	
OUTLOOK	10 fl oz/a B	
N-PAK AMS	2.5 % v/v B	
7 VERDICT	5 fl oz/a A	12.5 bcd
LIBERTY 280 SL	32 fl oz/a B	
ROUNDUP POWERMAX	22 fl oz/a B	
N-PAK AMS	2.5 % v/v B	
8 VERDICT	5 fl oz/a A	15.0 bcd
LIBERTY 280 SL	32 fl oz/a B	
ROUNDUP POWERMAX	16 fl oz/a B	
N-PAK AMS	2.5 % v/v B	
9 VERDICT	5 fl oz/a A	42.5 a
LIBERTY 280 SL	32 fl oz/a B	
SELECT MAX	6 fl oz/a B	
OUTLOOK	10 fl oz/a B	
N-PAK AMS	2.5 % v/v B	
LSD P=.05		10.56
Standard Deviation		7.24
CV		43.06
Levene's F		3.076
Levene's Prob(F)		0.013*
Skewness		1.2063*
Kurtosis		2.1708*
Replicate F		2.382
Replicate Prob(F)		0.0945
Treatment F		11.519
Treatment Prob(F)		0.0001

## North Dakota State University

Trial ID: 19S-PROSPER-SOY-17 Protocol ID: 19S-PROSPER-SOY-17 Project ID: MKD-H-2019-US-D41	<b style="text-align: center;">Liberty Plus Glyphosate Combinations in LLGT27 Soybean</b> Location: PROSPER Investigator (Creator): Dr. Joe Ikley Study Director: Joe Ikley Sponsor Contact: BASF - Ken Deibert
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**Pest Type**

W, Weed = Weed or volunteer crop

**Pest Code**

AVEFA, Avena fatua, Wild oat = US

**Crop Type, Code**

C = EPPO species (Bayer) codes

GLXMA, BSOY, Glycine max, Soybean = US

**Rating Type**

CONTRO = control / burndown or knockdown

**Rating Unit**

% = percent

**Trial Comments**

General comments: The growing season was abnormal with excessive rain in the second half of June and most of July. This trial received hail on 7/3, but the crop was recovered quickly. Wild oat was the dominant weed in the species, choking out any broadleaf pressure early on.

# North Dakota State University

## Liberty Foundation Treatments in E3 Soybean

Trial ID: 19S-PROSPER-SOY-18 without dates of Location: PROSPER Trial Year: 2019  
 Protocol ID: 19S-PROSPER-SOY-18 Investigator (Creator): Dr. Joe Ikley  
 Project ID: MKD-H-2019-US-D43 Study Director: Joe Ikley  
 Sponsor Contact: BASF - Ken Deibert

### General Trial Information

**Study Director:** Joe Ikley  
**Investigator:** Dr. Joe Ikley

**Trial Status:** E established

**Trial Status Date:** Jun-7-2019

**Last Changed By:** Dr. Joe Ikley

**ARM Trial Created On:** Mar-18-2021

**Protocol Revision Date:** Apr-23-2019

**Conducted Under GLP:** No

**Conducted Under GEP:** No

### Contacts

**Role:** STYDIR study director

**Study Director:** Joe Ikley

**Role:** INVEST investigator

**Investigator:** Dr. Joe Ikley

**Role:** SPONSR sponsor

**Sponsor:** BASF - Ken Deibert

### Site and Design

**Treated Plot Width:** 6.67 FT

**Treated Plot Length:** 30 FT

**Treated Plot Area:** 200.1 FT<sup>2</sup> **Treatments:** 8

**Replications:** 4

**Study Design:** RACOB L Randomized Complete Block (RCB)

### Soil Description

**Description Name:** Prosper

**% Sand:** 24.7 **% OM:** 4 **Texture:** SIL silt loam

**% Silt:** 53.3 **pH:** 7.3 **Soil Name:** Kindred-Bearden Silty Clay Loam

**% Clay:** 22 **CEC:** 18.5

### Application Description

	A			B			C			D		
<b>Application Date</b>	May-29-2019			Jun-24-2019			Jun-24-2019			Jul-12-2019		
<b>Appl. Start Time</b>	4:00 AM			10:55 AM			10:55 AM			8:25 AM		
<b>Appl. Stop Time</b>	4:30 AM			11:15 AM			11:15 AM			8:30 AM		
<b>Interval to Prev. Appl.</b>				26 DAYS			26 DAYS			18 DAYS		
<b>Application Method</b>	SPRAY			SPRAY			SPRAY			SPRAY		
<b>Application Timing</b>	PREEM			2-3" WEEDS			2-3" WEEDS			14-21 DAT B		
<b>Application Placement</b>	SOIL			BROFOL			BROFOL			BROFOL		
<b>Applied By</b>	Ikley, J.			Haugrud, N.			Haugrud, N.			Haugrud, N.		
<b>Appl. Entry Date</b>	Jun-7-2019			Jul-19-2019			Jul-19-2019			Jul-19-2019		
<b>Air Temperature Start, Stop</b>	82	82	F	70	70	F	70	70	F	74	74	F
<b>% Relative Humidity Start, Stop</b>	25	25		77	78		77	78		78	80	
<b>Wind Velocity+Dir. Start</b>	6	MPH	NNE	3	MPH	SW	3	MPH	SW	5	MPH	NW
<b>Wind Velocity+Dir. Stop</b>	6	MPH	NNE	3	MPH	SW	3	MPH	SW	4	MPH	NW
<b>Wind Velocity+Dir. Max</b>	8	MPH	NNE	4	MPH	SW	4	MPH	SW	7	MPH	N
<b>Wet Leaves (Y/N)</b>	N no			N no			N no			N no		
<b>Soil Temperature</b>	66		F	66		F	66		F	71		F
<b>Soil Moisture</b>	GOOD			SLIWET			SLIWET			WET		
<b>Soil Surface Condition</b>	COURSE			COURSE			COURSE			COURSE		
<b>% Cloud Cover</b>	30			90			90			30		

# North Dakota State University

## Liberty Foundation Treatments in E3 Soybean

Trial ID: 19S-PROSPER-SOY-18 without dates of      Location: PROSPER      Trial Year: 2019  
 Protocol ID: 19S-PROSPER-SOY-18      Investigator (Creator): Dr. Joe Ikley  
 Project ID: MKD-H-2019-US-D43      Study Director: Joe Ikley  
 Sponsor Contact: BASF - Ken Deibert

**Application Equipment**

	A	B	C	D
<b>Appl. Equipment</b>	Mjолnir	Narsil	Narsil	Narsil
<b>Equipment Type</b>	BACCAI	BACCAI	BACCAI	BACCAI
<b>Operation Pressure</b>	28 PSI	28 PSI	28 PSI	28 PSI
<b>Nozzle Type</b>	TTI	TT	AIXR	AIXR
<b>Nozzle Size</b>	11002	11002	11002	11002
<b>Nozzle Spacing</b>	20 IN	20 IN	20 IN	20 IN
<b>Boom Length</b>	6.67 FT	6.67 FT	6.67 FT	6.67 FT
<b>Boom Height</b>	18 IN	18 IN	18 IN	18 IN
<b>Ground Speed</b>	3 MPH	3 MPH	3 MPH	3 MPH
<b>Carrier</b>	WATER	WATER	WATER	WATER
<b>Application Amount</b>	15 GAL/AC	15 GAL/AC	15 GAL/AC	15 GAL/AC
<b>Mix Size</b>	1119 mL	1119 mL	1119 mL	1119 mL
<b>Propellant</b>	COMCO2	COMCO2	COMCO2	COMCO2

Context	Date	By	Notes
STATUS	May-10-2019	Dr. Joe Ikley	Automatically added by ARM: Trial Status updated to 'S' during trial creation.
STATUS	Jun-7-2019	Dr. Joe Ikley	Automatically added by ARM: Trial Status updated to 'E' when Application Date entered.

Pest Type		W Weed CHEAL Chenopodium album common lambsquarters	W Weed AMAPO Amaranthus powellii Powell amaranth	W Weed AMBEL Ambrosia artemisiifolia Common ragweed
Pest Code				
Pest Scientific Name				
Pest Name				
Crop Type, Code	C GLXMA			
BBCH Scale	BSOY			
Crop Scientific Name	Glycine max			
Crop Name	Soybean			
Rating Date	Jul-1-2019	Jul-1-2019	Jul-1-2019	Jul-1-2019
SE Group No.	1	2	3	4
Rating Type	PHYTO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Aug-12-2019	Aug-12-2019	Aug-12-2019	Aug-12-2019
Days After First/Last Applic.	33 7	33 7	33 7	33 7
Plant-Eval Interval	33 DP-1	33 DP-1	33 DP-1	33 DP-1
Days After Emergence	24 DE-1	24 DE-1	24 DE-1	24 DE-1
Trt Treatment No. Name	Rate Unit Appl Code			
		1*	2*	3*
		4*		
1 Untreated Check		0.0 -	0.0 b	0.0 c
2 VERDICT	5 fl oz/a A	0.0 -	99.3 a	97.8 a
ENLIST DUO	3.5 pt/a C			
N-PAK AMS	3 lb ai/a C			
3 VERDICT	5 fl oz/a A	0.0 -	98.5 a	93.8 b
LIBERTY 280 SL	32 fl oz/a B			99.5 a
ROUNDUP POWERMAX	32 fl oz/a B			
N-PAK AMS	3 lb ai/a B			
4 VERDICT	5 fl oz/a A	0.0 -	100.0 a	95.8 ab
LIBERTY 280 SL	32 fl oz/a C			99.5 a
ENLIST ONE	1.5 pt/a C			
N-PAK AMS	3 lb ai/a C			
5 VERDICT	5 fl oz/a A	0.0 -	99.8 a	97.8 ab
LIBERTY 280 SL	32 fl oz/a C			100.0 a
ENLIST ONE	1.5 pt/a C			
ROUNDUP POWERMAX	32 fl oz/a C			
N-PAK AMS	3 lb ai/a C			



## North Dakota State University

### Liberty Foundation Treatments in E3 Soybean

Trial ID: 19S-PROSPER-SOY-18 without dates of	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-18	Investigator (Creator): Dr. Joe Ikley	
Project ID: MKD-H-2019-US-D43	Study Director: Joe Ikley	
	Sponsor Contact: BASF - Ken Deibert	

		W Weed CHEAL Chenopodium album common lambsquarters	W Weed AMAPO Amaranthus powellii Powell amaranth	W Weed AMBEL Ambrosia artemisiifolia Common ragweed		
Pest Type						
Pest Code						
Pest Scientific Name						
Pest Name						
Crop Type, Code	C GLXMA					
BBCH Scale	BSOY					
Crop Scientific Name	Glycine max					
Crop Name	Soybean					
Rating Date	Jul-1-2019	Jul-1-2019	Jul-1-2019	Jul-1-2019		
SE Group No.	1	2	3	4		
Rating Type	PHYTO	CONTRO	CONTRO	CONTRO		
Rating Unit	%	%	%	%		
Number of Subsamples	1	1	1	1		
Data Entry Date	Aug-12-2019	Aug-12-2019	Aug-12-2019	Aug-12-2019		
Days After First/Last Applic.	33 7	33 7	33 7	33 7		
Plant-Eval Interval	33 DP-1	33 DP-1	33 DP-1	33 DP-1		
Days After Emergence	24 DE-1	24 DE-1	24 DE-1	24 DE-1		
Trt Treatment No. Name	Rate Rate Unit	Appl Code	1*	2*	3*	4*
6 VERDICT	5 fl oz/a A		0.0 -	97.3 a	95.0 ab	98.8 a
LIBERTY 280 SL	32 fl oz/a B					
ROUNDUP POWERMAX	32 fl oz/a B					
N-PAK AMS	3 lb ai/a B					
ENLIST DUO	3.5 pt/a D					
N-PAK AMS	3 lb ai/a D					
7 VERDICT	5 fl oz/a A		0.0 -	100.0 a	99.3 a	96.3 a
ENLIST DUO	3.5 pt/a C					
N-PAK AMS	3 lb ai/a C					
LIBERTY 280 SL	32 fl oz/a D					
ROUNDUP POWERMAX	32 fl oz/a D					
N-PAK AMS	3 lb ai/a D					
8 VERDICT	5 fl oz/a A		0.0 -	98.8 a	97.8 ab	99.5 a
LIBERTY 280 SL	32 fl oz/a C					
ENLIST ONE	1.5 pt/a C					
ROUNDUP POWERMAX	32 fl oz/a C					
OUTLOOK	10 fl oz/a C					
N-PAK AMS	3 lb ai/a C					
LSD P=.05				1.78	3.29	3.15
Standard Deviation	0.00			1.21	2.24	2.14
CV	0.0			1.39	2.64	2.48
Levene's F	0.00			0.671	1.329	2.686
Levene's Prob(F)				0.694	0.28	0.033*
Skewness				-2.3733*	-2.344*	-2.3606*
Kurtosis				3.8874*	3.8021*	3.8491*
Replicate F	0.000			0.314	3.526	0.933
Replicate Prob(F)	1.0000			0.8149	0.0327	0.4424
Treatment F	0.000			3367.531	942.662	1063.390
Treatment Prob(F)	1.0000			0.0001	0.0001	0.0001

# North Dakota State University

## Liberty Foundation Treatments in E3 Soybean

Trial ID: 19S-PROSPER-SOY-18 without dates af	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-18	Investigator (Creator): Dr. Joe Ikley	
Project ID: MKD-H-2019-US-D43	Study Director: Joe Ikley	
	Sponsor Contact: BASF - Ken Deibert	

Pest Type	W Weed POLCO Fallopia convolvulus wild buckwheat	W Weed SETPU Setaria helvola yellow foxtail	C GLXMA BSOY Glycine max Soybean	W Weed CHEAL Chenopodium album common lambsquarters	W Weed AMAPO Amaranthus powellii Powell amaranth
Pest Code					
Pest Scientific Name					
Pest Name					
Crop Type, Code					
BBCH Scale					
Crop Scientific Name					
Crop Name					
Rating Date	Jul-1-2019	Jul-1-2019	Jul-8-2019	Jul-8-2019	Jul-8-2019
SE Group No.	5	6	7	8	9
Rating Type	CONTRO	CONTRO	PHYTO	CONTRO	CONTRO
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Data Entry Date	Aug-12-2019	Aug-12-2019	Aug-12-2019	Aug-12-2019	Aug-12-2019
Days After First/Last Applic.	33 7	33 7	40 14	40 14	40 14
Plant-Eval Interval	33 DP-1	33 DP-1	40 DP-1	40 DP-1	40 DP-1
Days After Emergence	24 DE-1	24 DE-1	31 DE-1	31 DE-1	31 DE-1
Trt No.	Treatment	Rate	Appl Code		
		Rate Unit		5*	6*
1	Untreated Check			0.0 b	0.0 c
2	VERDICT	5 fl oz/a A		95.0 a	99.5 a
	ENLIST DUO	3.5 pt/a C			
	N-PAK AMS	3 lb ai/a C			
3	VERDICT	5 fl oz/a A		97.0 a	100.0 a
	LIBERTY 280 SL	32 fl oz/a B			
	ROUNDUP POWERMAX	32 fl oz/a B			
	N-PAK AMS	3 lb ai/a B			
4	VERDICT	5 fl oz/a A		99.5 a	83.8 b
	LIBERTY 280 SL	32 fl oz/a C			
	ENLIST ONE	1.5 pt/a C			
	N-PAK AMS	3 lb ai/a C			
5	VERDICT	5 fl oz/a A		96.3 a	98.3 a
	LIBERTY 280 SL	32 fl oz/a C			
	ENLIST ONE	1.5 pt/a C			
	ROUNDUP POWERMAX	32 fl oz/a C			
	N-PAK AMS	3 lb ai/a C			

## North Dakota State University

<b>Liberty Foundation Treatments in E3 Soybean</b>		
Trial ID: 19S-PROSPER-SOY-18 without dates af	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-18	Investigator (Creator): Dr. Joe Ikley	
Project ID: MKD-H-2019-US-D43	Study Director: Joe Ikley	
	Sponsor Contact: BASF - Ken Deibert	

Pest Type	W Weed	W Weed	W Weed	W Weed		
Pest Code	POLCO	SETPU		CHEAL		
Pest Scientific Name	Fallopia convolvulus	Setaria helvola		Chenopodium album		
Pest Name	wild buckwheat	yellow foxtail		common lambsquarters		
Crop Type, Code			C GLXMA			
BBCH Scale			BSOY			
Crop Scientific Name			Glycine max			
Crop Name			Soybean			
Rating Date	Jul-1-2019	Jul-1-2019	Jul-8-2019	Jul-8-2019		
SE Group No.	5	6	7	8		
Rating Type	CONTRO	CONTRO	PHYTO	CONTRO		
Rating Unit	%	%	%	%		
Number of Subsamples	1	1	1	1		
Data Entry Date	Aug-12-2019	Aug-12-2019	Aug-12-2019	Aug-12-2019		
Days After First/Last Applic.	33 7	33 7	40 14	40 14		
Plant-Eval Interval	33 DP-1	33 DP-1	40 DP-1	40 DP-1		
Days After Emergence	24 DE-1	24 DE-1	31 DE-1	31 DE-1		
Trt Treatment						
No. Name	Rate Unit Appl Code	5*	6*	7*	8*	9*
6 VERDICT	5 fl oz/a A	99.0 a	99.5 a	0.0 -	99.3 a	88.8 b
LIBERTY 280 SL	32 fl oz/a B					
ROUNDUP POWERMAX	32 fl oz/a B					
N-PAK AMS	3 lb ai/a B					
ENLIST DUO	3.5 pt/a D					
N-PAK AMS	3 lb ai/a D					
7 VERDICT	5 fl oz/a A	95.8 a	98.8 a	0.0 -	99.8 a	99.5 a
ENLIST DUO	3.5 pt/a C					
N-PAK AMS	3 lb ai/a C					
LIBERTY 280 SL	32 fl oz/a D					
ROUNDUP POWERMAX	32 fl oz/a D					
N-PAK AMS	3 lb ai/a D					
8 VERDICT	5 fl oz/a A	98.3 a	100.0 a	0.0 -	100.0 a	99.3 a
LIBERTY 280 SL	32 fl oz/a C					
ENLIST ONE	1.5 pt/a C					
ROUNDUP POWERMAX	32 fl oz/a C					
OUTLOOK	10 fl oz/a C					
N-PAK AMS	3 lb ai/a C					
LSD P=.05	3.15	4.02	.	1.37	4.36	
Standard Deviation	2.15	2.74	0.00	0.93	2.97	
CV	2.52	3.22	0.0	1.07	3.57	
Levene's F	2.432	8.475	0.00	8.796	1.096	
Levene's Prob(F)	0.049*	0.001*	.	0.001*	0.397	
Skewness	-2.3544*	-2.2503*	.	-2.374*	-2.2567*	
Kurtosis	3.8336*	3.4853*	.	3.8892*	3.538*	
Replicate F	1.491	2.365	0.000	1.578	2.739	
Replicate Prob(F)	0.2458	0.1000	1.0000	0.2244	0.0690	
Treatment F	1029.570	646.110	0.000	5701.503	522.418	
Treatment Prob(F)	0.0001	0.0001	1.0000	0.0001	0.0001	

# North Dakota State University

## Liberty Foundation Treatments in E3 Soybean

Trial ID: 19S-PROSPER-SOY-18 without dates af	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-18	Investigator (Creator): Dr. Joe Ikley	
Project ID: MKD-H-2019-US-D43	Study Director: Joe Ikley	
	Sponsor Contact: BASF - Ken Deibert	

Pest Type	W Weed	W Weed	W Weed	
Pest Code	AMBEL	POLCO	SETPU	
Pest Scientific Name	Ambrosia artemisiifolia	Fallopia convolvulus	Setaria helvola	
Pest Name	Common ragweed	wild buckwheat	yellow foxtail	
Crop Type, Code				C GLXMA
BBCH Scale				BSOY
Crop Scientific Name				Glycine max
Crop Name				Soybean
Rating Date	Jul-8-2019	Jul-8-2019	Jul-8-2019	Jul-12-2019
SE Group No.	10	11	12	13
Rating Type	CONTRO	CONTRO	CONTRO	PHYTO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Aug-12-2019	Aug-12-2019	Aug-12-2019	Aug-12-2019
Days After First/Last Applic.	40 14	40 14	40 14	44 18
Plant-Eval Interval	40 DP-1	40 DP-1	40 DP-1	44 DP-1
Days After Emergence	31 DE-1	31 DE-1	31 DE-1	35 DE-1
Trt Treatment	Rate	Rate	Rate	Rate
No. Name	Unit Code	Unit Code	Unit Code	Unit Code
1 Untreated Check	0.0 b	0.0 b	0.0 c	0.0 -
2 VERDICT	5 fl oz/a A	99.0 a	97.8 a	95.8 a
ENLIST DUO	3.5 pt/a C			
N-PAK AMS	3 lb ai/a C			
3 VERDICT	5 fl oz/a A	99.0 a	95.5 a	95.8 a
LIBERTY 280 SL	32 fl oz/a B			
ROUNDUP POWERMAX	32 fl oz/a B			
N-PAK AMS	3 lb ai/a B			
4 VERDICT	5 fl oz/a A	99.8 a	98.3 a	89.9 b
LIBERTY 280 SL	32 fl oz/a C			
ENLIST ONE	1.5 pt/a C			
N-PAK AMS	3 lb ai/a C			
5 VERDICT	5 fl oz/a A	100.0 a	96.8 a	97.5 a
LIBERTY 280 SL	32 fl oz/a C			
ENLIST ONE	1.5 pt/a C			
ROUNDUP POWERMAX	32 fl oz/a C			
N-PAK AMS	3 lb ai/a C			

# North Dakota State University

## Liberty Foundation Treatments in E3 Soybean

Trial ID: 19S-PROSPER-SOY-18 without dates af	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-18	Investigator (Creator): Dr. Joe Ikley	
Project ID: MKD-H-2019-US-D43	Study Director: Joe Ikley	
	Sponsor Contact: BASF - Ken Deibert	

Pest Type	W Weed	W Weed	W Weed	
Pest Code	AMBEL	POLCO	SETPU	
Pest Scientific Name	Ambrosia artemisiifolia	Fallopia convolvulus	Setaria helvola	
Pest Name	Common ragweed	wild buckwheat	yellow foxtail	
Crop Type, Code				C GLXMA
BBCH Scale				BSOY
Crop Scientific Name				Glycine max
Crop Name				Soybean
Rating Date	Jul-8-2019	Jul-8-2019	Jul-8-2019	Jul-12-2019
SE Group No.	10	11	12	13
Rating Type	CONTRO	CONTRO	CONTRO	PHYTO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Aug-12-2019	Aug-12-2019	Aug-12-2019	Aug-12-2019
Days After First/Last Applic.	40 14	40 14	40 14	44 18
Plant-Eval Interval	40 DP-1	40 DP-1	40 DP-1	44 DP-1
Days After Emergence	31 DE-1	31 DE-1	31 DE-1	35 DE-1
Trt Treatment No. Name	Rate Unit	Appl Code		
6 VERDICT	5 fl oz/a A		10*	11*
LIBERTY 280 SL	32 fl oz/a B			12*
ROUNDUP POWERMAX	32 fl oz/a B			13*
N-PAK AMS	3 lb ai/a B			
ENLIST DUO	3.5 pt/a D			
N-PAK AMS	3 lb ai/a D			
7 VERDICT	5 fl oz/a A		99.3 a	95.3 a
ENLIST DUO	3.5 pt/a C			97.3 a
N-PAK AMS	3 lb ai/a C			
LIBERTY 280 SL	32 fl oz/a D			
ROUNDUP POWERMAX	32 fl oz/a D			
N-PAK AMS	3 lb ai/a D			
8 VERDICT	5 fl oz/a A		99.8 a	98.0 a
LIBERTY 280 SL	32 fl oz/a C			99.0 a
ENLIST ONE	1.5 pt/a C			
ROUNDUP POWERMAX	32 fl oz/a C			
OUTLOOK	10 fl oz/a C			
N-PAK AMS	3 lb ai/a C			
LSD P=.05	1.12	3.34	4.44	.
Standard Deviation	0.76	2.27	3.01	0.00
CV	0.88	2.68	3.59	0.0
Levene's F	3.321	1.207	1.012	0.00
Levene's Prob(F)	0.013*	0.337	0.449	.
Skewness	-2.3786*	-2.3525*	-2.2804*	.
Kurtosis	3.9028*	3.8267*	3.5039*	.
Replicate F	0.429	3.485	0.458	0.000
Replicate Prob(F)	0.7346	0.0339	0.7148	1.0000
Treatment F	8474.695	912.351	510.200	0.000
Treatment Prob(F)	0.0001	0.0001	0.0001	1.0000

# North Dakota State University

## Liberty Foundation Treatments in E3 Soybean

Trial ID: 19S-PROSPER-SOY-18 without dates af	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-18	Investigator (Creator): Dr. Joe Ikley	
Project ID: MKD-H-2019-US-D43	Study Director: Joe Ikley	
	Sponsor Contact: BASF - Ken Deibert	

	W Weed CHEAL	W Weed AMAPO	W Weed AMBEL	W Weed POLCO
Pest Type	Chenopodium album	Amaranthus powellii	Ambrosia artemisiifolia	Fallopia convolvulus
Pest Code	common lambsquarters	Powell amaranth	Common ragweed	wild buckwheat
Pest Scientific Name				
Pest Name				
Crop Type, Code				
BBCH Scale				
Crop Scientific Name				
Crop Name				
Rating Date	Jul-12-2019	Jul-12-2019	Jul-12-2019	Jul-12-2019
SE Group No.	14	15	16	17
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Aug-12-2019	Aug-12-2019	Aug-12-2019	Aug-12-2019
Days After First/Last Applic.	44 18	44 18	44 18	44 18
Plant-Eval Interval	44 DP-1	44 DP-1	44 DP-1	44 DP-1
Days After Emergence	35 DE-1	35 DE-1	35 DE-1	35 DE-1
Trt Treatment				
No. Name	14*	15*	16*	17*
Rate				
Unit				
Appl Code				
1 Untreated Check	0.0 b	0.0 d	0.0 b	0.0 c
2 VERDICT	100.0 a	99.3 a	99.3 a	99.0 a
ENLIST DUO				
N-PAK AMS				
3 VERDICT	98.3 a	85.0 c	97.3 a	90.0 b
LIBERTY 280 SL				
ROUNDUP POWERMAX				
N-PAK AMS				
4 VERDICT	100.0 a	88.8 bc	98.5 a	96.8 ab
LIBERTY 280 SL				
ENLIST ONE				
N-PAK AMS				
5 VERDICT	100.0 a	94.5 ab	99.5 a	94.8 ab
LIBERTY 280 SL				
ENLIST ONE				
ROUNDUP POWERMAX				
N-PAK AMS				

## North Dakota State University

### Liberty Foundation Treatments in E3 Soybean

Trial ID: 19S-PROSPER-SOY-18 without dates of	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-18	Investigator (Creator): Dr. Joe Ikley	
Project ID: MKD-H-2019-US-D43	Study Director: Joe Ikley	
	Sponsor Contact: BASF - Ken Deibert	

	W Weed CHEAL	W Weed AMAPO	W Weed AMBEL	W Weed POLCO
Pest Type	Chenopodium album	Amaranthus powellii	Ambrosia artemisiifolia	Fallopia convolvulus
Pest Code	common lambsquarters	Powell amaranth	Common ragweed	wild buckwheat
Pest Scientific Name				
Pest Name				
Crop Type, Code				
BBCH Scale				
Crop Scientific Name				
Crop Name				
Rating Date	Jul-12-2019	Jul-12-2019	Jul-12-2019	Jul-12-2019
SE Group No.	14	15	16	17
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Aug-12-2019	Aug-12-2019	Aug-12-2019	Aug-12-2019
Days After First/Last Applic.	44 18	44 18	44 18	44 18
Plant-Eval Interval	44 DP-1	44 DP-1	44 DP-1	44 DP-1
Days After Emergence	35 DE-1	35 DE-1	35 DE-1	35 DE-1
Trt Treatment No. Name	Rate Unit Appl Code			
		14*	15*	16*
6 VERDICT	5 fl oz/a A	100.0 a	82.5 c	99.3 a
LIBERTY 280 SL	32 fl oz/a B			93.5 ab
ROUNDUP POWERMAX	32 fl oz/a B			
N-PAK AMS	3 lb ai/a B			
ENLIST DUO	3.5 pt/a D			
N-PAK AMS	3 lb ai/a D			
7 VERDICT	5 fl oz/a A	100.0 a	98.5 a	98.8 a
ENLIST DUO	3.5 pt/a C			99.0 a
N-PAK AMS	3 lb ai/a C			
LIBERTY 280 SL	32 fl oz/a D			
ROUNDUP POWERMAX	32 fl oz/a D			
N-PAK AMS	3 lb ai/a D			
8 VERDICT	5 fl oz/a A	100.0 a	96.0 a	99.3 a
LIBERTY 280 SL	32 fl oz/a C			98.0 a
ENLIST ONE	1.5 pt/a C			
ROUNDUP POWERMAX	32 fl oz/a C			
OUTLOOK	10 fl oz/a C			
N-PAK AMS	3 lb ai/a C			
LSD P=.05	1.15	5.90	2.03	5.32
Standard Deviation	0.78	4.01	1.38	3.62
CV	0.9	4.98	1.59	4.32
Levene's F	1.744	3.271	3.803	1.814
Levene's Prob(F)	0.146	0.014*	0.006*	0.131
Skewness	-2.3775*	-2.1593*	-2.3732*	-2.3007*
Kurtosis	3.8995*	3.2615*	3.8871*	3.666*
Replicate F	1.000	2.444	0.323	1.151
Replicate Prob(F)	0.4123	0.0924	0.8084	0.3519
Treatment F	8097.408	272.515	2570.591	353.406
Treatment Prob(F)	0.0001	0.0001	0.0001	0.0001

# North Dakota State University

## Liberty Foundation Treatments in E3 Soybean

Trial ID: 19S-PROSPER-SOY-18 without dates af	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-18	Investigator (Creator): Dr. Joe Ikley	
Project ID: MKD-H-2019-US-D43	Study Director: Joe Ikley	
	Sponsor Contact: BASF - Ken Deibert	

Pest Type	W Weed	W Weed	W Weed
Pest Code	SETPU	CHEAL	AMAPO
Pest Scientific Name	Setaria helvola	Chenopodium album	Amaranthus powellii
Pest Name	yellow foxtail	common lambsquarters	Powell amaranth
Crop Type, Code		C GLXMA	
BBCH Scale		BSOY	
Crop Scientific Name		Glycine max	
Crop Name		Soybean	
Rating Date	Jul-12-2019	Jul-27-2019	Jul-27-2019
SE Group No.	18	19	20
Rating Type	CONTRO	PHYTO	CONTRO
Rating Unit	%	%	%
Number of Subsamples	1	1	1
Data Entry Date	Aug-12-2019	Aug-12-2019	Aug-12-2019
Days After First/Last Applic.	44 18	59 15	59 15
Plant-Eval Interval	44 DP-1	59 DP-1	59 DP-1
Days After Emergence	35 DE-1	50 DE-1	50 DE-1
Trt No.	Treatment Name	Rate	Appl Code
		Rate Unit	
1	Untreated Check		
		0.0 b	0.0 -
			0.0 c
			0.0 e
2	VERDICT	5 fl oz/a A	
	ENLIST DUO	3.5 pt/a C	
	N-PAK AMS	3 lb ai/a C	
		96.8 a	0.0 -
			100.0 a
			90.0 ab
3	VERDICT	5 fl oz/a A	
	LIBERTY 280 SL	32 fl oz/a B	
	ROUNDUP POWERMAX	32 fl oz/a B	
	N-PAK AMS	3 lb ai/a B	
		93.5 a	0.0 -
			90.0 b
			40.0 d
4	VERDICT	5 fl oz/a A	
	LIBERTY 280 SL	32 fl oz/a C	
	ENLIST ONE	1.5 pt/a C	
	N-PAK AMS	3 lb ai/a C	
		94.1 a	0.0 -
			100.0 a
			70.0 c
5	VERDICT	5 fl oz/a A	
	LIBERTY 280 SL	32 fl oz/a C	
	ENLIST ONE	1.5 pt/a C	
	ROUNDUP POWERMAX	32 fl oz/a C	
	N-PAK AMS	3 lb ai/a C	
		99.0 a	0.0 -
			98.8 a
			76.3 bc



## North Dakota State University

### Liberty Foundation Treatments in E3 Soybean

Trial ID: 19S-PROSPER-SOY-18 without dates of	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-18	Investigator (Creator): Dr. Joe Ikley	
Project ID: MKD-H-2019-US-D43	Study Director: Joe Ikley	
	Sponsor Contact: BASF - Ken Deibert	

Pest Type	W Weed	W Weed	W Weed	W Weed
Pest Code	SETPU		CHEAL	AMAPO
Pest Scientific Name	Setaria helvola		Chenopodium album	Amaranthus powellii
Pest Name	yellow foxtail		common lambsquarters	Powell amaranth
Crop Type, Code		C GLXMA		
BBCH Scale		BSOY		
Crop Scientific Name		Glycine max		
Crop Name		Soybean		
Rating Date	Jul-12-2019	Jul-27-2019	Jul-27-2019	Jul-27-2019
SE Group No.	18	19	20	21
Rating Type	CONTRO	PHYTO	CONTRO	CONTRO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Aug-12-2019	Aug-12-2019	Aug-12-2019	Aug-12-2019
Days After First/Last Applic.	44 18	59 15	59 15	59 15
Plant-Eval Interval	44 DP-1	59 DP-1	59 DP-1	59 DP-1
Days After Emergence	35 DE-1	50 DE-1	50 DE-1	50 DE-1
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code	18*	19*
6 VERDICT	5 fl oz/a A		98.0 a	0.0 -
LIBERTY 280 SL	32 fl oz/a B			100.0 a
ROUNDUP POWERMAX	32 fl oz/a B			99.3 a
N-PAK AMS	3 lb ai/a B			
ENLIST DUO	3.5 pt/a D			
N-PAK AMS	3 lb ai/a D			
7 VERDICT	5 fl oz/a A		96.0 a	0.0 -
ENLIST DUO	3.5 pt/a C			99.5 a
N-PAK AMS	3 lb ai/a C			97.0 a
LIBERTY 280 SL	32 fl oz/a D			
ROUNDUP POWERMAX	32 fl oz/a D			
N-PAK AMS	3 lb ai/a D			
8 VERDICT	5 fl oz/a A		99.0 a	0.0 -
LIBERTY 280 SL	32 fl oz/a C			99.3 a
ENLIST ONE	1.5 pt/a C			87.5 abc
ROUNDUP POWERMAX	32 fl oz/a C			
OUTLOOK	10 fl oz/a C			
N-PAK AMS	3 lb ai/a C			
LSD P=.05	3.54	.	5.94	14.49
Standard Deviation	2.40	0.00	4.04	9.85
CV	2.85	0.0	4.7	14.07
Levene's F	3.087	0.00	58.264	16.518
Levene's Prob(F)	0.019*	.	0.001*	0.001*
Skewness	-2.2945*	.	-2.2902*	-1.2538*
Kurtosis	3.5549*	.	3.6113*	0.2799
Replicate F	0.657	0.000	1.645	0.737
Replicate Prob(F)	0.5883	1.0000	0.2094	0.5418
Treatment F	812.170	0.000	298.850	47.870
Treatment Prob(F)	0.0001	1.0000	0.0001	0.0001

## North Dakota State University

### Liberty Foundation Treatments in E3 Soybean

Trial ID: 19S-PROSPER-SOY-18 without dates af	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-18	Investigator (Creator): Dr. Joe Ikley	
Project ID: MKD-H-2019-US-D43	Study Director: Joe Ikley	
	Sponsor Contact: BASF - Ken Deibert	

Pest Type	W Weed	W Weed	W Weed
Pest Code	AMBEL	POLCO	SETPU
Pest Scientific Name	Ambrosia artemisiifolia	Fallopia convolvulus	Setaria helvola
Pest Name	Common ragweed	wild buckwheat	yellow foxtail
Crop Type, Code			
BBCH Scale			
Crop Scientific Name			
Crop Name			
Rating Date	Jul-27-2019	Jul-27-2019	Jul-27-2019
SE Group No.	22	23	24
Rating Type	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%
Number of Subsamples	1	1	1
Data Entry Date	Aug-12-2019	Aug-12-2019	Aug-12-2019
Days After First/Last Applic.	59 15	59 15	59 15
Plant-Eval Interval	59 DP-1	59 DP-1	59 DP-1
Days After Emergence	50 DE-1	50 DE-1	50 DE-1
Trt Treatment			
No. Name	Rate Appl Rate Unit Code		
1 Untreated Check	22*	23*	24*
2 VERDICT	5 fl oz/a A	0.0 b	0.0 c
ENLIST DUO	3.5 pt/a C	97.5 a	96.0 a
N-PAK AMS	3 lb ai/a C		71.3 bc
3 VERDICT	5 fl oz/a A	92.5 a	72.3 b
LIBERTY 280 SL	32 fl oz/a B		55.0 c
ROUNDUP POWERMAX	32 fl oz/a B		
N-PAK AMS	3 lb ai/a B		
4 VERDICT	5 fl oz/a A	96.3 a	89.3 ab
LIBERTY 280 SL	32 fl oz/a C		61.1 bc
ENLIST ONE	1.5 pt/a C		
N-PAK AMS	3 lb ai/a C		
5 VERDICT	5 fl oz/a A	100.0 a	87.5 ab
LIBERTY 280 SL	32 fl oz/a C		76.3 bc
ENLIST ONE	1.5 pt/a C		
ROUNDUP POWERMAX	32 fl oz/a C		
N-PAK AMS	3 lb ai/a C		

## North Dakota State University

### Liberty Foundation Treatments in E3 Soybean

Trial ID: 19S-PROSPER-SOY-18 without dates of	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-18	Investigator (Creator): Dr. Joe Ikley	
Project ID: MKD-H-2019-US-D43	Study Director: Joe Ikley	
	Sponsor Contact: BASF - Ken Deibert	

Pest Type	W Weed	W Weed	W Weed
Pest Code	AMBEL	POLCO	SETPU
Pest Scientific Name	Ambrosia artemisiifolia	Fallopia convolvulus	Setaria helvola
Pest Name	Common ragweed	wild buckwheat	yellow foxtail
Crop Type, Code			
BBCH Scale			
Crop Scientific Name			
Crop Name			
Rating Date	Jul-27-2019	Jul-27-2019	Jul-27-2019
SE Group No.	22	23	24
Rating Type	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%
Number of Subsamples	1	1	1
Data Entry Date	Aug-12-2019	Aug-12-2019	Aug-12-2019
Days After First/Last Applic.	59 15	59 15	59 15
Plant-Eval Interval	59 DP-1	59 DP-1	59 DP-1
Days After Emergence	50 DE-1	50 DE-1	50 DE-1
Trt Treatment			
No. Name	22*	23*	24*
Rate			
Appl			
Rate Unit			
Code			
6 VERDICT	5 fl oz/a A		
LIBERTY 280 SL	32 fl oz/a B	100.0 a	100.0 a
ROUNDUP POWERMAX	32 fl oz/a B		99.5 a
N-PAK AMS	3 lb ai/a B		
ENLIST DUO	3.5 pt/a D		
N-PAK AMS	3 lb ai/a D		
7 VERDICT	5 fl oz/a A	100.0 a	100.0 a
ENLIST DUO	3.5 pt/a C		99.5 a
N-PAK AMS	3 lb ai/a C		
LIBERTY 280 SL	32 fl oz/a D		
ROUNDUP POWERMAX	32 fl oz/a D		
N-PAK AMS	3 lb ai/a D		
8 VERDICT	5 fl oz/a A	97.3 a	95.8 a
LIBERTY 280 SL	32 fl oz/a C		78.8 b
ENLIST ONE	1.5 pt/a C		
ROUNDUP POWERMAX	32 fl oz/a C		
OUTLOOK	10 fl oz/a C		
N-PAK AMS	3 lb ai/a C		
LSD P=.05	6.25	14.26	15.56
Standard Deviation	4.25	9.70	10.55
CV	4.98	12.11	15.53
Levene's F	1.696	1.121	8.503
Levene's Prob(F)	0.158	0.383	0.001*
Skewness	-2.3072*	-1.8396*	-1.1091*
Kurtosis	3.6787*	2.0855*	0.4278
Replicate F	0.177	2.228	0.897
Replicate Prob(F)	0.9105	0.1148	0.4601
Treatment F	264.959	48.044	35.955
Treatment Prob(F)	0.0001	0.0001	0.0001

## North Dakota State University

### Liberty Foundation Treatments in E3 Soybean

Trial ID: 19S-PROSPER-SOY-18 without dates af	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-18	Investigator (Creator): Dr. Joe Ikley	
Project ID: MKD-H-2019-US-D43	Study Director: Joe Ikley	
	Sponsor Contact: BASF - Ken Deibert	

Pest Type

W, Weed = Weed or volunteer crop

Pest Code

CHEAL, Chenopodium album, common lambsquarters = US  
 AMAPO, Amaranthus powellii, Powell amaranth = US  
 AMBEL, Ambrosia artemisiifolia, Common ragweed = US  
 POLCO, Fallopia convolvulus, wild buckwheat = US  
 SETPU, Setaria helvola, yellow foxtail = US

Crop Type Code

C = EPPO species (Bayer) codes  
 GLXMA, BSOY, Glycine max, Soybean = US

Rating Type

CONTRO = control / burndown or knockdown

Rating Unit

% = percent

Plant-Eval Interval

33 DP-1 = 1 GLXMA May-29-2019  
 40 DP-1 = 1 GLXMA May-29-2019  
 44 DP-1 = 1 GLXMA May-29-2019  
 59 DP-1 = 1 GLXMA May-29-2019

#### Trial Comments

General comments: The growing season was abnormal with excessive rain in the second half of June and most of July. This trial received hail on 7/3, but the crop was recovered quickly. The lack of rain after the PRE treatments made the preemergence herbicides show little to no effect.

# North Dakota State University

## Glyphosate and Glufosinate Combinations in LLGT27 Soybean

Trial ID: 19S-PROSPER-SOY-21      Location: PROSPER      Trial Year: 2019  
 Protocol ID: 19S-PROSPER-SOY-21      Investigator (Creator): Dr. Joe Ikley  
 Project ID: 19619      Study Director: Joe Ikley  
    Sponsor Contact: NDSU - Mike Ostlie

### General Trial Information

**Study Director:** Joe Ikley  
**Investigator:** Dr. Joe Ikley

**Trial Status:** E      established

**Trial Status Date:** Jul-23-2019

**Last Changed By:** Dr. Joe Ikley

**ARM Trial Created On:** May-10-2019

**Protocol Revision Date:** Apr-23-2019

**Conducted Under GLP:** No

**Conducted Under GEP:** No

### Contacts

**Role:** STYDIR study director

**Study Director:** Joe Ikley

**Role:** INVEST investigator

**Investigator:** Dr. Joe Ikley

**Role:** SPONSR sponsor

**Sponsor:** NDSU - Mike Ostlie

### Site and Design

**Treated Plot Width:** 6.67 FT

**Treated Plot Length:** 30 FT

**Treated Plot Area:** 200.1 FT<sup>2</sup>      **Treatments:** 12

**Replications:** 4

**Study Design:** RACOB L Randomized Complete Block (RCB)

### Soil Description

**Description Name:** Prosper

**% Sand:** 24.7      **% OM:** 4      **Texture:** SIL      silt loam

**% Silt:** 53.3      **pH:** 7.3      **Soil Name:** Kindred-Bearden Silty Clay Loam

**% Clay:** 22      **CEC:** 18.5

### Application Description

	A
<b>Application Date</b>	Jul-1-2019
<b>Appl. Start Time</b>	12:40 PM
<b>Appl. Stop Time</b>	1:05 PM
<b>Application Method</b>	SPRAY
<b>Application Timing</b>	3-6" WEEDS
<b>Application Placement</b>	BROFOL
<b>Applied By</b>	Haugrud, N.
<b>Appl. Entry Date</b>	Jul-23-2019
<b>Air Temperature Start, Stop</b>	80      86      F
<b>% Relative Humidity Start, Stop</b>	45      49
<b>Wind Velocity+Dir. Start</b>	4      MPH      NNE
<b>Wind Velocity+Dir. Stop</b>	2      MPH      NNE
<b>Wind Velocity+Dir. Max</b>	5      MPH      NNE
<b>Wet Leaves (Y/N)</b>	N no
<b>Soil Temperature</b>	76      F
<b>Soil Moisture</b>	SLIWET
<b>Soil Surface Condition</b>	SMOOTH
<b>% Cloud Cover</b>	30

# North Dakota State University

## Glyphosate and Glufosinate Combinations in LLGT27 Soybean

Trial ID: 19S-PROSPER-SOY-21	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-21	Investigator (Creator): Dr. Joe Ikley	
Project ID: 19619	Study Director: Joe Ikley	
	Sponsor Contact: NDSU - Mike Ostlie	

**Pest Stage At Each Application**

	A
<b>Pest 1 Code, Type, Scale</b>	XANST W BBCH
Stage Majority, Percent	14
Stage Minimum, Percent	14
Stage Maximum, Percent	15
Height Average	8 IN
Height Minimum, Maximum	7 11
Density Average	15 YD2
Density Minimum, Maximum	10 26
<b>Pest 2 Code, Type, Scale</b>	CHEAL W BBCH
Stage Majority, Percent	16
Stage Minimum, Percent	15
Stage Maximum, Percent	18
Height Average	7 IN
Height Minimum, Maximum	5 9
Density Average	8 YD2
Density Minimum, Maximum	3 16
<b>Pest 3 Code, Type, Scale</b>	AMAPO W BBCH
Stage Majority, Percent	16
Stage Minimum, Percent	14
Stage Maximum, Percent	18
Height Average	7 IN
Height Minimum, Maximum	5 10
Density Average	8 YD2
Density Minimum, Maximum	3 18
<b>Pest 4 Code, Type, Scale</b>	AMBEL W BBCH
Stage Majority, Percent	16
Stage Minimum, Percent	14
Stage Maximum, Percent	18
Height Average	6 IN
Height Minimum, Maximum	4 7
Density Average	10 YD2
Density Minimum, Maximum	3 10
<b>Pest 5 Code, Type, Scale</b>	SETPU W BBCH
Height Average	9 IN
Height Minimum, Maximum	7 11
Density Average	20 YD2
Density Minimum, Maximum	10 30

# North Dakota State University

## Glyphosate and Glufosinate Combinations in LLGT27 Soybean

Trial ID: 19S-PROSPER-SOY-21      Location: PROSPER      Trial Year: 2019  
 Protocol ID: 19S-PROSPER-SOY-21      Investigator (Creator): Dr. Joe Ikley  
 Project ID: 19619      Study Director: Joe Ikley  
 Sponsor Contact: NDSU - Mike Ostlie

**Application Equipment**

	A	
Appl. Equipment	Narsil	
Equipment Type	BACCAI	
Operation Pressure	28	PSI
Nozzle Type	AIXR	
Nozzle Size	11002	
Nozzle Spacing	20	IN
Boom Length	6.67	FT
Boom Height	18	IN
Ground Speed	3	MPH
Carrier	WATER	
Application Amount	15	GAL/AC
Mix Size	1119	mL
Propellant	COMCO2	

Context	Date	By	Notes
STATUS	May-10-2019	Dr. Joe Ikley	Automatically added by ARM: Trial Status updated to 'S' during trial creation.
STATUS	Jul-23-2019	Dr. Joe Ikley	Automatically added by ARM: Trial Status updated to 'E' when Application Date entered.

Pest Type	W Weed	W Weed	W Weed	W Weed
Pest Code	SETPU	CHEAL	AMAPO	AMBEL
Pest Scientific Name	Setaria helvola	Chenopodium album	Amaranthus powellii	Ambrosia artemisiifolia
Pest Name	yellow foxtail	common lambsquarters	Powell amaranth	Common ragweed
Rating Date	Jul-8-2019	Jul-8-2019	Jul-8-2019	Jul-8-2019
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Aug-8-2019	Aug-8-2019	Aug-8-2019	Aug-8-2019
Days After First/Last Applic.	7 7	7 7	7 7	7 7
Trt-Eval Interval	7 DA-A	7 DA-A	7 DA-A	7 DA-A
Plant-Eval Interval	40 DP-1	40 DP-1	40 DP-1	40 DP-1
Days After Emergence	31 DE-1	31 DE-1	31 DE-1	31 DE-1
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code	1*	2*
			3*	4*
1 Untreated Check			0.0 d	0.0 c
2 LIBERTY 280 SL N-PAK AMS	32 fl oz/a A 3 lb ai/a A		68.8 bc	95.0 a
3 ROUNDUP POWERMAX N-PAK AMS	28 fl oz/a A 3 lb ai/a A		100.0 a	99.8 a
4 LIBERTY 280 SL ROUNDUP POWERMAX N-PAK AMS	32 fl oz/a A 28 fl oz/a A 3 lb ai/a A		100.0 a	98.5 a
5 LIBERTY 280 SL ROUNDUP POWERMAX N-PAK AMS	32 fl oz/a A 21 fl oz/a A 3 lb ai/a A		97.5 a	97.5 a
6 LIBERTY 280 SL ROUNDUP POWERMAX N-PAK AMS	43 fl oz/a A 21 fl oz/a A 3 lb ai/a A		97.5 a	98.8 a
7 LIBERTY 280 SL CLASS ACT RIDION	32 fl oz/a A 2 % v/v A		66.3 c	97.5 a
8 LIBERTY 280 SL CLASS ACT NG	32 fl oz/a A 2.5 % v/v A		72.5 bc	97.5 a
9 LIBERTY 280 SL ENLIST DUO N-PAK AMS	32 fl oz/a A 4 pt/a A 3 lb ai/a A		95.0 a	98.8 a
				96.0 a
				95.0 a

## North Dakota State University

### Glyphosate and Glufosinate Combinations in LLGT27 Soybean

Trial ID: 19S-PROSPER-SOY-21	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-21	Investigator (Creator): Dr. Joe Ikley	
Project ID: 19619	Study Director: Joe Ikley	
Sponsor Contact: NDSU - Mike Ostlie		

Pest Type	W Weed	W Weed	W Weed	W Weed
Pest Code	SETPU	CHEAL	AMAPO	AMBEL
Pest Scientific Name	Setaria helvola	Chenopodium album	Amaranthus powellii	Ambrosia artemisiifolia
Pest Name	yellow foxtail	common lambsquarters	Powell amaranth	Common ragweed
Rating Date	Jul-8-2019	Jul-8-2019	Jul-8-2019	Jul-8-2019
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Aug-8-2019	Aug-8-2019	Aug-8-2019	Aug-8-2019
Days After First/Last Applic.	7 7	7 7	7 7	7 7
Trt-Eval Interval	7 DA-A	7 DA-A	7 DA-A	7 DA-A
Plant-Eval Interval	40 DP-1	40 DP-1	40 DP-1	40 DP-1
Days After Emergence	31 DE-1	31 DE-1	31 DE-1	31 DE-1
Trt Treatment	Rate	Rate	Rate	Rate
No. Name	Unit Code			
		1*	2*	3*
		4*		
10 LIBERTY 280 SL	32 fl oz/a A	73.8 b	98.8 a	96.3 a
ENLIST ONE	2 pt/a A			
N-PAK AMS	3 lb ai/a A			
11 ENLIST DUO	4 pt/a A	98.8 a	99.5 a	99.8 a
N-PAK AMS	3 lb ai/a A			
12 ENLIST ONE	2 pt/a A	0.0 d	60.0 b	57.5 b
N-PAK AMS	3 lb ai/a A			
LSD P=.05	5.43	4.94	6.63	7.29
Standard Deviation	3.78	3.43	4.61	5.07
CV	5.21	3.95	5.44	6.03
Levene's F	2.318	1.383	2.365	1.033
Levene's Prob(F)	0.028*	0.223	0.026*	0.439
Skewness	-1.3268*	-2.4885*	-2.387*	-2.4366*
Kurtosis	0.4108	5.0565*	4.6526*	4.9233*
Replicate F	0.681	0.323	1.910	2.791
Replicate Prob(F)	0.5697	0.8085	0.1472	0.0558
Treatment F	370.195	295.148	158.679	125.459
Treatment Prob(F)	0.0001	0.0001	0.0001	0.0001



## North Dakota State University

### Glyphosate and Glufosinate Combinations in LLGT27 Soybean

Trial ID: 19S-PROSPER-SOY-21	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-21	Investigator (Creator): Dr. Joe Ikley	
Project ID: 19619	Study Director: Joe Ikley	
	Sponsor Contact: NDSU - Mike Ostlie	

Pest Type	W Weed	W Weed	W Weed	W Weed
Pest Code	XANST	SETPU	CHEAL	AMAPO
Pest Scientific Name	Xanthium strumarium	Setaria helvola	Chenopodium album	Amaranthus powellii
Pest Name	Common cocklebur	yellow foxtail	common lambsquarters	Powell amaranth
Rating Date	Jul-8-2019	Jul-15-2019	Jul-15-2019	Jul-15-2019
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Aug-8-2019	Aug-8-2019	Aug-8-2019	Aug-8-2019
Days After First/Last Applic.	7 7	14 14	14 14	14 14
Trt-Eval Interval	7 DA-A	14 DA-A	14 DA-A	14 DA-A
Plant-Eval Interval	40 DP-1	47 DP-1	47 DP-1	47 DP-1
Days After Emergence	31 DE-1	38 DE-1	38 DE-1	38 DE-1
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code	5*	6*
1 Untreated Check			0.0 c	0.0 c
2 LIBERTY 280 SL	32 fl oz/a A		93.8 a	77.5 b
N-PAK AMS	3 lb ai/a A			92.5 b
3 ROUNDUP POWERMAX	28 fl oz/a A		96.5 a	100.0 a
N-PAK AMS	3 lb ai/a A			100.0 a
4 LIBERTY 280 SL	32 fl oz/a A		96.0 a	100.0 a
ROUNDUP POWERMAX	28 fl oz/a A			100.0 a
N-PAK AMS	3 lb ai/a A			97.5 ab
5 LIBERTY 280 SL	32 fl oz/a A		95.0 a	100.0 a
ROUNDUP POWERMAX	21 fl oz/a A			100.0 a
N-PAK AMS	3 lb ai/a A			90.0 abc
6 LIBERTY 280 SL	43 fl oz/a A		95.0 a	100.0 a
ROUNDUP POWERMAX	21 fl oz/a A			99.8 a
N-PAK AMS	3 lb ai/a A			97.3 ab
7 LIBERTY 280 SL	32 fl oz/a A		91.3 a	72.5 b
CLASS ACT RIDION	2 % v/v A			100.0 a
8 LIBERTY 280 SL	32 fl oz/a A		92.5 a	85.0 ab
CLASS ACT NG	2.5 % v/v A			100.0 a
9 LIBERTY 280 SL	32 fl oz/a A		92.5 a	100.0 a
ENLIST DUO	4 pt/a A			100.0 a
N-PAK AMS	3 lb ai/a A			97.3 ab

## North Dakota State University

### Glyphosate and Glufosinate Combinations in LLGT27 Soybean

Trial ID: 19S-PROSPER-SOY-21	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-21	Investigator (Creator): Dr. Joe Ikley	
Project ID: 19619	Study Director: Joe Ikley	
	Sponsor Contact: NDSU - Mike Ostlie	

Pest Type	W Weed	W Weed	W Weed	W Weed
Pest Code	XANST	SETPU	CHEAL	AMAPO
Pest Scientific Name	Xanthium strumarium	Setaria helvola	Chenopodium album	Amaranthus powellii
Pest Name	Common cocklebur	yellow foxtail	common lambsquarters	Powell amaranth
Rating Date	Jul-8-2019	Jul-15-2019	Jul-15-2019	Jul-15-2019
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Data Entry Date	Aug-8-2019	Aug-8-2019	Aug-8-2019	Aug-8-2019
Days After First/Last Applic.	7 7	14 14	14 14	14 14
Trt-Eval Interval	7 DA-A	14 DA-A	14 DA-A	14 DA-A
Plant-Eval Interval	40 DP-1	47 DP-1	47 DP-1	47 DP-1
Days After Emergence	31 DE-1	38 DE-1	38 DE-1	38 DE-1
Trt Treatment	Rate	Rate	Rate	Rate
No. Name	Unit Code	Unit Code	Unit Code	Unit Code
	5*	6*	7*	8*
10 LIBERTY 280 SL	32 fl oz/a A	96.0 a	77.5 b	100.0 a
ENLIST ONE	2 pt/a A			97.5 ab
N-PAK AMS	3 lb ai/a A			
11 ENLIST DUO	4 pt/a A	97.0 a	100.0 a	100.0 a
N-PAK AMS	3 lb ai/a A			
12 ENLIST ONE	2 pt/a A	55.0 b	0.0 c	97.5 a
N-PAK AMS	3 lb ai/a A			95.0 ab
LSD P=.05	5.24	10.92	2.92	12.94
Standard Deviation	3.64	7.59	2.03	8.99
CV	4.37	9.98	2.23	10.65
Levene's F	0.947	6.896	0.891	2.238
Levene's Prob(F)	0.51	0.001*	0.557	0.034*
Skewness	-2.4123*	-1.46*	-3.0605*	-2.2979*
Kurtosis	4.6679*	0.5774	7.8055*	4.4802*
Replicate F	1.275	0.711	1.221	3.472
Replicate Prob(F)	0.2989	0.5525	0.3175	0.0269
Treatment F	247.804	95.300	800.337	38.668
Treatment Prob(F)	0.0001	0.0001	0.0001	0.0001

## North Dakota State University

### Glyphosate and Glufosinate Combinations in LLGT27 Soybean

Trial ID: 19S-PROSPER-SOY-21	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-21	Investigator (Creator): Dr. Joe Ikley	
Project ID: 19619	Study Director: Joe Ikley	
	Sponsor Contact: NDSU - Mike Ostlie	

Pest Type	W Weed	W Weed
Pest Code	AMBEL	XANST
Pest Scientific Name	Ambrosia artemisiifolia	Xanthium strumarium
Pest Name	Common ragweed	Common cocklebur
Rating Date	Jul-15-2019	Jul-15-2019
Rating Type	CONTRO	CONTRO
Rating Unit	%	%
Number of Subsamples	1	1
Data Entry Date	Aug-8-2019	Aug-8-2019
Days After First/Last Applic.	14 14	14 14
Trt-Eval Interval	14 DA-A	14 DA-A
Plant-Eval Interval	47 DP-1	47 DP-1
Days After Emergence	38 DE-1	38 DE-1
Trt Treatment	Rate	Appl
No. Name	Rate Unit	Code
	9*	10*
1 Untreated Check		0.0 b
2 LIBERTY 280 SL	32 fl oz/a A	83.8 a
N-PAK AMS	3 lb ai/a A	98.8 a
3 ROUNDUP POWERMAX	28 fl oz/a A	98.5 a
N-PAK AMS	3 lb ai/a A	100.0 a
4 LIBERTY 280 SL	32 fl oz/a A	97.3 a
ROUNDUP POWERMAX	28 fl oz/a A	98.5 a
N-PAK AMS	3 lb ai/a A	
5 LIBERTY 280 SL	32 fl oz/a A	92.3 a
ROUNDUP POWERMAX	21 fl oz/a A	96.3 a
N-PAK AMS	3 lb ai/a A	
6 LIBERTY 280 SL	43 fl oz/a A	99.8 a
ROUNDUP POWERMAX	21 fl oz/a A	99.5 a
N-PAK AMS	3 lb ai/a A	
7 LIBERTY 280 SL	32 fl oz/a A	94.8 a
CLASS ACT RIDION	2 % v/v A	98.8 a
8 LIBERTY 280 SL	32 fl oz/a A	96.3 a
CLASS ACT NG	2.5 % v/v A	92.5 b
9 LIBERTY 280 SL	32 fl oz/a A	90.0 a
ENLIST DUO	4 pt/a A	97.5 a
N-PAK AMS	3 lb ai/a A	

## North Dakota State University

### Glyphosate and Glufosinate Combinations in LLGT27 Soybean

Trial ID: 19S-PROSPER-SOY-21	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-21	Investigator (Creator): Dr. Joe Ikley	
Project ID: 19619	Study Director: Joe Ikley	
	Sponsor Contact: NDSU - Mike Ostlie	

	W Weed	W Weed
Pest Type	AMBEL	XANST
Pest Code		
Pest Scientific Name	Ambrosia artemisiifolia	Xanthium strumarium
Pest Name	Common ragweed	Common cocklebur
Rating Date	Jul-15-2019	Jul-15-2019
Rating Type	CONTRO	CONTRO
Rating Unit	%	%
Number of Subsamples	1	1
Data Entry Date	Aug-8-2019	Aug-8-2019
Days After First/Last Applic.	14 14	14 14
Trt-Eval Interval	14 DA-A	14 DA-A
Plant-Eval Interval	47 DP-1	47 DP-1
Days After Emergence	38 DE-1	38 DE-1
Trt Treatment		
No. Name	Rate Appl Rate Unit Code	9*
10 LIBERTY 280 SL	32 fl oz/a A	96.3 a
ENLIST ONE	2 pt/a A	
N-PAK AMS	3 lb ai/a A	98.8 a
11 ENLIST DUO	4 pt/a A	98.8 a
N-PAK AMS	3 lb ai/a A	100.0 a
12 ENLIST ONE	2 pt/a A	87.5 a
N-PAK AMS	3 lb ai/a A	97.5 a
LSD P=.05	11.01	3.48
Standard Deviation	7.65	2.42
CV	8.87	2.69
Levene's F	2.701	0.806
Levene's Prob(F)	0.012*	0.633
Skewness	-2.6724*	-3.0519*
Kurtosis	6.142*	7.7784*
Replicate F	1.175	1.446
Replicate Prob(F)	0.3342	0.2470
Treatment F	52.002	551.190
Treatment Prob(F)	0.0001	0.0001

# North Dakota State University

## Glyphosate and Glufosinate Combinations in LLGT27 Soybean

Trial ID: 19S-PROSPER-SOY-21	Location: PROSPER	Trial Year: 2019
Protocol ID: 19S-PROSPER-SOY-21	Investigator (Creator): Dr. Joe Ikley	
Project ID: 19619	Study Director: Joe Ikley	
	Sponsor Contact: NDSU - Mike Ostlie	

Pest Type

W, Weed = Weed or volunteer crop

Pest Code

SETPU, Setaria helvola, yellow foxtail = US  
 CHEAL, Chenopodium album, common lambsquarters = US  
 AMAPO, Amaranthus powellii, Powell amaranth = US  
 AMBEL, Ambrosia artemisiifolia, Common ragweed = US  
 XANST, Xanthium strumarium, Common cocklebur = US

Rating Type

CONTRO = control / burndown or knockdown

Rating Unit

% = percent

Plant-Eval Interval

40 DP-1 = 1 GLXMA May-29-2019  
 47 DP-1 = 1 GLXMA May-29-2019

Trial Comments

General comments: The growing season was abnormal with excessive rain in the second half of June and most of July. There was a new flush of yellow foxtail, barnyardgrass, and Powell amaranth after the 14 DAT rating that masked the carcasses from plants present at application, so the 28 DAT rating was not taken.