

# Purdue Weed Science

Trial ID: 20S-MGS-SOY-17	<b>Nufarm - Panther MTZ in No-Till Glufosinate Soybeans</b>	
Protocol ID: 20S-MGS-SOY-17	Location: Lafayette	Trial Year: 2020
Project ID:	Investigator (Creator): Dr. Bill Johnson	
	Study Director: Brent Mansfield	
	Sponsor Contact: Dan Beran - Nufarm	

**General Trial Information**  
**Study Director:** Brent Mansfield **Title:** Research Associate  
**Investigator:** Dr. Bill Johnson **Title:** Professor

**Discipline:** H herbicide  
**Trial Status:** E established **Trial Reliability:** 1 usable data  
**ARM Trial Created On:** 6/5/2020  
**Initiation Date:** 6/5/2020

**Trial Location**  
**City:** Lafayette **Country:** USA United States  
**State/Prov.:** Indiana

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

**Contacts**

**Role:** STYDIR study director  
**Study Director:** Brent Mansfield **Title:** Research Associate  
**Organization:** Purdue University  
**Address 1:** 915 W. State Street  
**Country:** USA United States **E-mail:** brentmansfield@purdue.edu  
**City:** West Lafayette, IN **Postal Code:** 47907

**Role:** INVEST investigator  
**Investigator:** Dr. Bill Johnson **Title:** Professor  
**Organization:** Purdue University  
**Address 1:** 915 W. State Street  
**Country:** USA United States **E-mail:** wgj@purdue.edu  
**City:** West Lafayette, IN **Postal Code:** 47907

**Role:** SPONSR sponsor  
**Sponsor:** Dan Beran - Nufarm

**Crop Description**

**Crop 1:** C GLXMA Glycine max Soybean **BBCH Scale:** BSOY  
**Entry Date:** 12/22/2020 **Stage Scale:** BBCH  
**Variety:** Stine 32EA12  
**Attributes:** Glyphosate-R and 2,4-D-R  
**Planting Date:** 6/25/2020 **Planting Rate:** 157000 S/A  
**Depth:** 4.5 cm  
**Rows per Plot:** 4 **Planting Method:** PLANTD planted  
**Row Spacing:** 30 IN **Planting Equipment:** PP plot planter  
**Soil Temperature:** 89 F **Soil Moisture:** NORMAL normal, adequate  
**Emergence Date:** 7/3/2020

**Pest Description**

**Pest 1 Type:** W **Code:** AMATA *Amaranthus x tamariscinus* **Entry Date:** 12/22/2020  
**Common Name:** Common waterhemp **Stage Scale:** BBCH

**Pest 2 Type:** W **Code:** ERICA *Erigeron canadensis* **Entry Date:** 12/22/2020  
**Common Name:** Canada horseweed **Stage Scale:** BBCH

**Site and Design**

**Treated Plot Width:** 6.67 FT **Site Type:** FIELD field  
**Treated Plot Length:** 30 FT **Experimental Unit:** 1 PLOT plot  
**Treated Plot Area:** 200.1 FT2 **Treatments:** 8 **Tillage Type:** NOTILL no-till  
**Replications:** 4 **Study Design:** RACOB L Randomized Complete Block (RCB)

**Soil Description**

**Description Name:** Crosby-Miami Silt  
**% Sand:** 27 **% OM:** 2.4 **Texture:** SIL silt loam  
**% Silt:** 52 **pH:** 7.1  
**% Clay:** 21 **CEC:** 9.3

No.	Date	Moisture Total	Unit
1.	5/2/2020	0.025	CM
2.	5/3/2020	0.585	CM
3.	5/5/2020	0.481	CM
4.	5/6/2020	0.025	CM
5.	5/10/2020	0.101	CM
6.	5/14/2020	0.405	CM
7.	5/15/2020	0.279	CM
8.	5/17/2020	1.497	CM
9.	5/18/2020	0.914	CM
10.	5/19/2020	0.684	CM
11.	5/23/2020	0.178	CM
12.	5/27/2020	0.025	CM
13.	5/28/2020	0.331	CM
14.	6/4/2020	0.33	CM
15.	6/9/2020	0.787	CM
16.	6/20/2020	0.025	CM
17.	6/21/2020	0.075	CM
18.	6/22/2020	0.711	CM
19.	6/23/2020	0.203	CM
20.	6/27/2020	2.769	CM
21.	6/28/2020	0.229	CM
22.	6/29/2020	0.076	CM
23.	6/30/2020	1.829	CM
24.	7/10/2020	0.05	CM
25.	7/11/2020	0.914	CM
26.	7/12/2020	0.66	CM
27.	7/15/2020	0.127	CM
28.	7/16/2020	0.456	CM
29.	7/19/2020	0.051	CM
30.	7/21/2020	1.423	CM
31.	7/22/2020	0.329	CM
32.	7/23/2020	0.178	CM
33.	7/27/2020	1.295	CM
34.	7/30/2020	1.599	CM

Application Description			
	A	B	C
Application Date	6/5/2020	6/25/2020	7/21/2020
Appl. Start Time	11:15 AM	6:00 PM	12:00 PM
Appl. Stop Time	11:45 AM	6:15 PM	12:25 PM
Interval to Prev. Appl.		20 DAYS	26 DAYS
Application Method	SPRAY	SPRAY	SPRAY
Application Timing	A	B	C
Application Placement	BROADC	BROSOI	BROADC
Applied By	B. MANSFIELD	B. MANSFIELD	B. MANSFIELD
Appl. Entry Date	12/22/2020	12/22/2020	12/22/2020
Air Temperature Start, Stop	81, 81 F	79, 79 F	86, 86 F
% Relative Humidity Start, Stop	64, 64	42, 42	66, 66
Wind Velocity+Dir. Start	2 MPH, W	1 MPH, S	7 MPH, ESE
Wind Velocity+Dir. Stop	2.5 MPH, W	3 MPH, S	5.5 MPH, ESE
Wind Velocity+Dir. Max	2.5 MPH, W	4 MPH, S	8 MPH, ESE
Wet Leaves (Y/N)	N, no	N, no	N, no
Soil Temperature	80 F	81 F	88 F
Soil Moisture	NORMAL	NORMAL	NORMAL
% Cloud Cover	35	0	100

**Crop Stage At Each Application**

	<b>A</b>	<b>B</b>	<b>C</b>
<b>Crop 1 Code, BBCH Scale</b>	GLXMA, BSOY	GLXMA, BSOY	GLXMA, BSOY
<b>Days after Emergence</b>	-28	-8	18
<b>Stage Majority, Percent</b>	00, -	00, -	14, -
<b>Stage Minimum, Percent</b>	00, -	00, -	13, -
<b>Stage Maximum, Percent</b>	00, -	00, -	15, -
<b>Height Average</b>	0 IN	0 IN	5 IN
<b>Height Minimum, Maximum</b>	0, 0	0, 0	4, 6

**Pest Stage At Each Application**

	<b>A</b>	<b>B</b>	<b>C</b>
<b>Pest 1 Code, Type, Scale</b>	AMATA, W, BBCH	AMATA, W, BBCH	AMATA, W, BBCH
<b>Stage Majority, Percent</b>	16, -	18, -	16, -
<b>Stage Minimum, Percent</b>	11, -	14, -	12, -
<b>Stage Maximum, Percent</b>	18, -	18, -	18, -
<b>Height Average</b>	2 IN	8 IN	3 IN
<b>Height Minimum, Maximum</b>	0.5, 3.5	1, 16	0.5, 6
<b>Density Average</b>	35 FT2	10 FT2	2 FT2
<b>Pest 2 Code, Type, Scale</b>	ERICA, W, BBCH	ERICA, W, BBCH	ERICA, W, BBCH
<b>Stage Majority, Percent</b>	15, -	19, -	19, -
<b>Stage Minimum, Percent</b>	19, -	19, -	19, -
<b>Stage Maximum, Percent</b>	19, -	19, -	19, -
<b>Height Average</b>	3.5 IN	6 IN	8 IN
<b>Height Minimum, Maximum</b>	1, 5	3, 8	3, 16
<b>Density Average</b>	7 FT2	3 FT2	3 FT2

**Application Equipment**

	<b>A</b>	<b>B</b>	<b>C</b>
<b>Appl. Equipment</b>	CO2 BACKPACK	CO2 BACKPACK	CO2 BACKPACK
<b>Equipment Type</b>	BACSPR	BACSPR	BACSPR
<b>Nozzle Model</b>	AIXR110015	TT110015	TT110015
<b>Nozzle Type</b>	FLAFAI	TEEJTU	TEEJTU
<b>Nozzle Spacing</b>	20.0 IN	20.0 IN	20.0 IN
<b>Nozzles/Row</b>	4.0	4.0	4.0
<b>Boom Length</b>	6.67 FT	6.67 FT	6.67 FT
<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 Overage</b>	0 mL	0 mL	0 mL
<b>Mix Size</b>	1119.0 mL	1119.0 mL	1119.0 mL
<b>Propellant</b>	COMCO2	COMCO2	COMCO2

**Notes**

<b>Context</b>	<b>Date</b>	<b>By</b>	<b>Notes</b>
STATUS	6/5/2020	Dr. Bill Johnson	Automatically added by ARM: Trial Status updated to 'S' during trial creation.

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## Nufarm - Panther MTZ in No-Till Glufosinate Soybeans

Location: Lafayette      Trial Year: 2020

Trial ID: 20S-MGS-SOY-17  
 Protocol ID: 20S-MGS-SOY-17      Investigator (Creator): Dr. Bill Johnson  
 Project ID:      Study Director: Brent Mansfield  
 Sponsor Contact: Dan Beran - Nufarm

Pest Type	W, Weed	W, Weed		W, Weed	W, Weed
Pest Code	AMATA	ERICA		AMATA	ERICA
Pest Scientific Name	Amaranthus x ta>	Erigeron canad>		Amaranthus x ta>	Erigeron canad>
Pest Name	Common waterhemp	Canada horseweed		Common waterhemp	Canada horseweed
Crop Type, Code			C, GLXMA		
BBCH Scale			BSOY		
Crop Scientific Name			Glycine max		
Crop Name			Soybean		
Rating Date	6/25/2020	6/25/2020	7/20/2020	7/20/2020	7/20/2020
Part Rated	PLANT, P	PLANT, P	PLANT, C	PLANT, P	PLANT, P
Rating Type	CONTRO	CONTRO	PHYGEN	CONTRO	CONTRO
Rating Unit/Min/Max	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100
Number of Subsamples	1	1	1	1	1
Assessed By	B. MANSFIELD	B. MANSFIELD	B. MANSFIELD	B. MANSFIELD	B. MANSFIELD
Data Entry Date	12/22/2020	12/22/2020	12/22/2020	12/22/2020	12/22/2020
Rating Timing	0 DAB	0 DAB	0 DAC	0 DAC	0 DAC
Days After First/Last Applic.	20, 20	20, 20	45, 25	45, 25	45, 25
Plant-Eval Interval	0 DP-1	0 DP-1	25 DP-1	25 DP-1	25 DP-1
Days After Emergence	-8 DE-1	-8 DE-1	17 DE-1	17 DE-1	17 DE-1
Trt No.	1	2	3	4	5
Treatment Name					
Rate					
Rate Unit					
Appl Code					
1 UNTREATED	0.0	0.0	0.0	0.0	0.0
2 NUP-19070	92.5 bc	80.0 cd	0.0 -	97.0 -	96.0 a
ACTIVATOR 90 NIS	0.25 % V/V				
PANTHER MTZ	12 FL OZ/A				
CREDIT XTREME	32 FL OZ/A				
MSO ULTRA	1 % V/V				
CHEETAH	29 FL OZ/A				
AMSOL	3 LB AI/A				
3 SPITFIRE	93.8 b	87.5 b	0.0 -	90.5 -	98.5 a
ACTIVATOR 90 NIS	0.25 % V/V				
PANTHER MTZ	12 FL OZ/A				
CREDIT XTREME	32 FL OZ/A				
MSO ULTRA	1 % V/V				
CHEETAH	29 FL OZ/A				
AMSOL	3 LB AI/A				
4 NUP-19070	100.0 a	97.0 a	0.0 -	90.0 -	83.0 c
PANTHER MTZ	15 FL OZ/A				
CREDIT XTREME	32 FL OZ/A				
MSO ULTRA	1 % V/V				
CHEETAH	29 FL OZ/A				
AMSOL	3 LB AI/A				
5 NUP-19070	91.3 bc	79.5 d	0.0 -	97.0 -	94.3 ab
ACTIVATOR 90 NIS	0.25 % V/V				
PANTHER PRO	12 FL OZ/A				
CREDIT XTREME	32 FL OZ/A				
MSO ULTRA	1 % V/V				
CHEETAH	29 FL OZ/A				
AMSOL	3 LB AI/A				
6 SPITFIRE	91.3 bc	86.3 bc	0.0 -	95.5 -	98.5 a
ACTIVATOR 90 NIS	0.25 % V/V				
PANTHER PRO	12 FL OZ/A				
CREDIT XTREME	32 FL OZ/A				
MSO ULTRA	1 % V/V				
CHEETAH	29 FL OZ/A				
AMSOL	3 LB AI/A				
7 NUP-19070	100.0 a	97.5 a	0.0 -	93.5 -	87.5 bc
PANTHER PRO	15 FL OZ/A				
CREDIT XTREME	32 FL OZ/A				
MSO ULTRA	1 % V/V				
CHEETAH	29 FL OZ/A				
AMSOL	3 LB AI/A				

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).  
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.  
 Untreated treatment(s) 1 excluded from analysis.  
 Could not calculate LSD (% mean diff) for columns 3,6,7 because error mean square = 0.  
 ^Calculated from residual.

Pest Type	W, Weed	W, Weed	W, Weed	W, Weed		
Pest Code	AMATA	ERICA	AMATA	ERICA		
Pest Scientific Name	Amaranthus x ta>	Erigeron canade>	Amaranthus x ta>	Erigeron canade>		
Pest Name	Common waterhemp	Canada horseweed	Common waterhemp	Canada horseweed		
Crop Type, Code			C, GLXMA			
BBCH Scale			BSOY			
Crop Scientific Name			Glycine max			
Crop Name			Soybean			
Rating Date	6/25/2020	6/25/2020	7/20/2020	7/20/2020		
Part Rated	PLANT, P	PLANT, P	PLANT, C	PLANT, P		
Rating Type	CONTRO	CONTRO	PHYGEN	CONTRO		
Rating Unit/Min/Max	% , 0, 100	% , 0, 100	% , 0, 100	% , 0, 100		
Number of Subsamples	1	1	1	1		
Assessed By	B. MANSFIELD	B. MANSFIELD	B. MANSFIELD	B. MANSFIELD		
Data Entry Date	12/22/2020	12/22/2020	12/22/2020	12/22/2020		
Rating Timing	0 DAB	0 DAB	0 DAC	0 DAC		
Days After First/Last Applic.	20, 20	20, 20	45, 25	45, 25		
Plant-Eval Interval	0 DP-1	0 DP-1	25 DP-1	25 DP-1		
Days After Emergence	-8 DE-1	-8 DE-1	17 DE-1	17 DE-1		
Trt Treatment	1	2	3	4		
No. Name						
Rate						
Rate Unit						
Appl Code						
8 NUP-19070	11 FL OZ/A A	90.0 c	81.3 bcd	0.0 -	93.5 -	95.5 a
ACTIVATOR 90 NIS	0.25 % V/V A					
AUTHORITY MTZ	14 OZ/A B					
CREDIT XTREME	32 FL OZ/A B					
MSO ULTRA	1 % V/V B					
CHEETAH	29 FL OZ/A C					
AMSOL	3 LB AI/A C					
LSD P=.05	2.81	6.48	.	5.56	7.36	
Standard Deviation	1.89	4.36	0.00	3.75	4.95	
CV	2.01	5.01	0.0	3.99	5.31	
Grand Mean	94.11	87.00	0.00	93.86	93.32	
Levene's F^	1.202	0.423	.	0.734	1.392	
Levene's Prob(F)	0.344	0.855	.	0.628	0.264	
Rank X2	.	.	.	.	.	
P(Rank X2)	.	.	.	.	.	
Skewness^	0.3947	0.6114	.	-0.9646*	0.3578	
Kurtosis^	-0.0714	0.1275	.	0.6313	1.5677	
Replicate F	1.583	6.552	0.000	5.450	2.333	
Replicate Prob(F)	0.2282	0.0035	1.0000	0.0076	0.1084	
Treatment F	19.667	12.241	0.000	2.321	5.626	
Treatment Prob(F)	0.0001	0.0001	1.0000	0.0776	0.0019	

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Pest Type				W, Weed	W, Weed
Pest Code				AMATA	ERICA
Pest Scientific Name				Amaranthus x ta>	Erigeron canade>
Pest Name				Common waterhemp	Canada horseweed
Crop Type, Code					
BBCH Scale					
Crop Scientific Name					
Crop Name					
Rating Date				8/4/2020	8/4/2020
Part Rated				PLANT, C	PLANT, P
Rating Type				PHYGEN	CONTRO
Rating Unit/Min/Max				%, 0, 100	%, 0, 100
Number of Subsamples				1	1
Assessed By				B. MANSFIELD	B. MANSFIELD
Data Entry Date				12/22/2020	12/22/2020
Rating Timing				14 DAC	14 DAC
Days After First/Last Applic.				60, 14	60, 14
Plant-Eval Interval				40 DP-1	40 DP-1
Days After Emergence				32 DE-1	32 DE-1
Trt	Treatment	Rate	Appl	6	7
No.	Name	Rate Unit	Code		
1	UNTREATED			0.0	0.0
2	NUP-19070	11 FL OZ/A	A	0.0 -	100.0 -
	ACTIVATOR 90 NIS	0.25 % V/V	A		
	PANTHER MTZ	12 FL OZ/A	B		
	CREDIT XTREME	32 FL OZ/A	B		
	MSO ULTRA	1 % V/V	B		
	CHEETAH	29 FL OZ/A	C		
	AMSOL	3 LB AI/A	C		
3	SPITFIRE	20 FL OZ/A	A	0.0 -	100.0 -
	ACTIVATOR 90 NIS	0.25 % V/V	A		
	PANTHER MTZ	12 FL OZ/A	B		
	CREDIT XTREME	32 FL OZ/A	B		
	MSO ULTRA	1 % V/V	B		
	CHEETAH	29 FL OZ/A	C		
	AMSOL	3 LB AI/A	C		
4	NUP-19070	11 FL OZ/A	A	0.0 -	100.0 -
	PANTHER MTZ	15 FL OZ/A	A		
	CREDIT XTREME	32 FL OZ/A	A		
	MSO ULTRA	1 % V/V	A		
	CHEETAH	29 FL OZ/A	C		
	AMSOL	3 LB AI/A	C		
5	NUP-19070	11 FL OZ/A	A	0.0 -	100.0 -
	ACTIVATOR 90 NIS	0.25 % V/V	A		
	PANTHER PRO	12 FL OZ/A	B		
	CREDIT XTREME	32 FL OZ/A	B		
	MSO ULTRA	1 % V/V	B		
	CHEETAH	29 FL OZ/A	C		
	AMSOL	3 LB AI/A	C		
6	SPITFIRE	20 FL OZ/A	A	0.0 -	100.0 -
	ACTIVATOR 90 NIS	0.25 % V/V	A		
	PANTHER PRO	12 FL OZ/A	B		
	CREDIT XTREME	32 FL OZ/A	B		
	MSO ULTRA	1 % V/V	B		
	CHEETAH	29 FL OZ/A	C		
	AMSOL	3 LB AI/A	C		
7	NUP-19070	11 FL OZ/A	A	0.0 -	100.0 -
	PANTHER PRO	15 FL OZ/A	A		
	CREDIT XTREME	32 FL OZ/A	A		
	MSO ULTRA	1 % V/V	A		
	CHEETAH	29 FL OZ/A	C		
	AMSOL	3 LB AI/A	C		

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Pest Type		W, Weed	W, Weed
Pest Code		AMATA	ERICA
Pest Scientific Name		Amaranthus x ta>	Erigeron canad>
Pest Name		Common waterhemp	Canada horseweed
Crop Type, Code	C, GLXMA		
BBCH Scale	BSOY		
Crop Scientific Name	Glycine max		
Crop Name	Soybean		
Rating Date	8/4/2020	8/4/2020	8/4/2020
Part Rated	PLANT, C	PLANT, P	PLANT, P
Rating Type	PHYGEN	CONTRO	CONTRO
Rating Unit/Min/Max	% , 0, 100	% , 0, 100	% , 0, 100
Number of Subsamples	1	1	1
Assessed By	B. MANSFIELD	B. MANSFIELD	B. MANSFIELD
Data Entry Date	12/22/2020	12/22/2020	12/22/2020
Rating Timing	14 DAC	14 DAC	14 DAC
Days After First/Last Applic.	60, 14	60, 14	60, 14
Plant-Eval Interval	40 DP-1	40 DP-1	40 DP-1
Days After Emergence	32 DE-1	32 DE-1	32 DE-1
Trt		6	7
Treatment			8
No. Name	Rate Unit	Appl Code	
8 NUP-19070	11 FL OZ/A	A	
ACTIVATOR 90 NIS	0.25 % V/V	A	
AUTHORITY MTZ	14 OZ/A	B	
CREDIT XTREME	32 FL OZ/A	B	
MSO ULTRA	1 % V/V	B	
CHEETAH	29 FL OZ/A	C	
AMSOL	3 LB AI/A	C	
LSD P=.05	.	.	1.64
Standard Deviation	0.00	0.00	1.10
CV	0.0	0.0	1.11
Grand Mean	0.00	100.00	99.54
Levene's F^	.	.	1.52
Levene's Prob(F)	.	.	0.22
Rank X2	.	.	.
P(Rank X2)	.	.	.
Skewness^	.	.	-1.0593*
Kurtosis^	.	.	2.1529*
Replicate F	0.000	0.000	1.046
Replicate Prob(F)	1.0000	1.0000	0.3964
Treatment F	0.000	0.000	1.261
Treatment Prob(F)	1.0000	1.0000	0.3234

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).  
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## Nufarm - Panther MTZ in No-Till Glufosinate Soybeans

Location: Lafayette Trial Year: 2020

Trial ID: 20S-MGS-SOY-17

Protocol ID: 20S-MGS-SOY-17

Project ID:

Investigator (Creator): Dr. Bill Johnson

Study Director: Brent Mansfield

Sponsor Contact: Dan Beran - Nufarm

### Pest Type

W, Weed = Weed or volunteer crop

### Pest Code

AMATA, Amaranthus x tamariscinus, Common waterhemp = US

ERICA, Erigeron canadensis, Canada horseweed = US

### Crop Type Code

C = EPP0 species (Bayer) codes

GLXMA, BSOY, Glycine max, Soybean = US

### Part Rated

PLANT = plant

P = Pest is Part Rated

C = Crop is Part Rated

### Rating Type

CONTRO = control / burndown or knockdown

PHYGEN = phytotoxicity - general / injury

### Rating Unit/Min/Max

%, 0, 100 = percent

### Plant-Eval Interval

0 DP-1 = 1 GLXMA 6/25/2020

25 DP-1 = 1 GLXMA 6/25/2020

40 DP-1 = 1 GLXMA 6/25/2020