

# Purdue Weed Science

## USB Metribuzin Tank-mix Trial

Trial ID: 23-USB-Metribuzin  
 Protocol ID: 23-USB-Metribuzin Location: Trial Year: 2023  
 Project ID: Project ID 2: Project ID 3:  
 Study Director: Sponsor Contact:  
 Investigator: Bryan Young

### General Trial Information

**Investigator:** Bryan Young **Title:** Professor

**Status:** E established

**ARM Trial Created On:** May-10-2023

### Trial Location

**City:** Francesville **Country:** USA United States  
**State/Prov.:** Indiana **County:** Pulaski

**Latitude of LL Corner °:** 40.9114888 N  
**Longitude of LL Corner °:** -86.8959615 W

### Regulations

**Conducted Under GLP:** No

**Conducted Under GEP:** No

**Role:** INVEST investigator **Title:** Professor  
**Investigator:** Bryan Young  
**Organization:** Purdue University  
**Address 1:** 915 W State Street **Phone No.:** 765-496-1646  
**Address 2:** Lilly Hall of Life Sciences  
**Country:** USA United States **E-mail:** BryanYoung@purdue.edu  
**City:** West Lafayette **State/Prov:** IN **Postal Code:** 47907

### Crop Description

**Crop 1:** C GLXMA Glycine max Soybean **BBCH Scale:** BSOY  
**Entry Date:** May-13-2023 **Stage Scale:** BBCH  
**Variety:** Asgrow 30XF2  
**Planting Date:** May-10-2023 **Planting Rate:** 140000 S/A  
**Depth:** 1.75 IN  
**Rows per Plot:** 4 **Planting Method:** SEEDED seeded  
**Row Spacing:** 30 IN **Planting Equipment:** PP plot planter

### Pest Description

**Pest 1 Type:** W **Code:** AMATU *Amaranthus tuberculatus* **Entry Date:** Jun-12-2023  
**Common Name:** tall waterhemp **Stage Scale:** BBCH

**Pest 2 Type:** W **Code:** DIGSA *Digitaria sanguinalis* **Entry Date:** Aug-23-2023  
**Common Name:** crabgrass, large **Stage Scale:** BBCH

**Pest 3 Type:** W **Code:** CHEAL *Chenopodium album* **Entry Date:** Aug-23-2023  
**Common Name:** lambsquarters, common **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 FT<sup>2</sup> **Tillage Type:** NOTILL no-till  
**Replications:** 4 **Treatments:** 21 **Plots:** 84 **Study Design:** RACOB L Randomized Complete Block (RCB)  
**Distance between Blocks:** 1 FT  
**Distance between 'Plot' Experimental Units:** 0.5 FT

### Field Prep./Maintenance:

5/4/23: Blanket application of Roundup PowerMax 1 qt/A plus 2,4-D LV4 1 pt/A for burndown of winter annual weeds  
 5/10/23: Blanket application of Gramoxone 3SL at 2.5 pt/A plus HSOC 0.5%v/v for burndown of emerged weeds

### Soil Description

**Description Name:** FRAN 22  
**% Sand:** 74 **% OM:** 3.2 **Texture:** SL sandy loam  
**% Silt:** 16  
**% Clay:** 10 **Fert. Level:** G good  
**pH:** 6.7 **CEC:** 9.4  
**Soil Drainage:** G good

### Weather Conditions

**Overall Moisture Conditions:** BELNOR below normal  
**Weather Station Name:** FRAN **Distance:** 100 FT

No.	Date	Moisture Total	Unit
1.	May-12-2023	0.65	IN
2.	May-14-2023	0.01	IN
3.	May-15-2023	0.01	IN
4.	May-19-2023	0.08	IN
5.	May-28-2023	0.7	IN
6.	May-31-2023	1.24	IN
7.	Jun-8-2023	0.68	IN
8.	Jun-11-2023	0.02	IN
9.	Jun-13-2023	0.37	IN
10.	Jun-14-2023	0.01	IN
11.	Jun-20-2023	0.73	IN
12.	Jun-23-2023	1	IN
13.	Jun-25-2023	1	IN
14.	Jun-26-2023	0.34	IN
15.	Jun-27-2023	0.01	IN
16.	Jul-1-2023	0.58	IN
17.	Jul-2-2023	0.37	IN
18.	Jul-5-2023	0.09	IN
19.	Jul-6-2023	0.01	IN
20.	Jul-8-2023	0.71	IN
21.	Jul-12-2023	0.11	IN
22.	Jul-15-2023	1.09	IN

#### Application Description

	A
Date	May-11-2023
Start Time	9:45 AM
Stop Time	10:45 AM
Method	SPRAY
Timing	PRE
Placement	BROADC
Applied By	AM
Entry Date	May-13-2023
Air Temperature Start, Stop	80, 80 F
% Relative Humidity Start, Stop	45.8, 45
Wind Velocity+Dir. Start	3 MPH, ESE
Wind Velocity+Dir. Stop	6 MPH, SE
Wind Velocity+Dir. Max	6 MPH, SE
Wet Leaves (Y/N)	N, no
Soil Temperature	63 F
Soil Moisture	NORMAL
% Cloud Cover	20
First Moisture Occurred On	May-12-2023
Amount of First Moisture	0.65 IN
Moisture 1 Week After Appl.	0.67 IN

#### Crop Stage At Each Application

	A
Crop 1 Code, BBCH Scale	GLXMA, BSOY
Stage Majority, Percent	00, -

**Pest Stage At Each Application**

	<b>A</b>
<b>Pest 1 Code, Type, Scale</b>	AMATU, W, BBCH
<b>Stage Majority, Percent</b>	00, -
<b>Pest 2 Code, Type, Scale</b>	DIGSA, W, BBCH
<b>Stage Majority, Percent</b>	00, -
<b>Pest 3 Code, Type, Scale</b>	CHEAL, W, BBCH
<b>Stage Majority, Percent</b>	00, -

**Application Equipment**

	<b>A</b>
<b>Equipment Name</b>	XR8002-15GPA
<b>Equipment Type</b>	SPRBAC
<b>Operation Pressure</b>	25 PSI
<b>Nozzle Model</b>	XR
<b>Nozzle Type</b>	FLAFXR
<b>Nozzle TradeName</b>	TEEJET
<b>Nozzle Tip Size, Color</b>	8002, YELLOW
<b>Nozzle Spacing</b>	20 IN
<b>Boom Length</b>	6.67 FT
<b>Boom Height</b>	18 IN
<b>Carrier</b>	WATER
<b>Application Amount</b>	15 GAL/AC
<b>Mix Size</b>	0.2956 GAL
<b>Propellant</b>	COMCO2

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Rating Date		May-25-2023	Jun-1-2023	Jun-8-2023	Jun-8-2023	Jun-22-2023	May-25-2023			
Rating Type		PHYGEN	PHYGEN	PHYGEN	HEIGHT	PHYGEN	CONTRO			
Rating Unit		%	%	%	cm	%	%			
Crop Scientific Name		Glycine max	Glycine max	Glycine max	Glycine max	Glycine max				
Crop Name		Soybean	Soybean	Soybean	Soybean	Soybean				
Pest Scientific Name							Amaranthus tube>			
Pest Name							waterhemp, tall			
Trt No.	Treatment Name	Rate	Appl Unit	Code	1*	3*	5*	6*	15*	2*
1	NONTREATED				0.0 a	0.0 a	0.0 f	9.9 a	0.0 a	0.0 d
2	TRICOR	0.375 lb ai/a	A		0.0 a	0.0 a	0.8 ef	11.1 a	0.0 a	98.8 a
3	TRICOR	0.56 lb ai/a	A		0.0 a	1.3 a	2.3 b-e	10.4 a	0.0 a	99.0 a
4	VALOR EZ	0.078 lb ai/a	A		0.0 a	0.0 a	2.0 cde	10.2 a	0.0 a	98.0 bc
5	ZIDUA SC	0.114 lb ai/a	A		0.0 a	0.0 a	0.0 f	9.4 a	0.0 a	97.8 c
6	TRICOR VALOR EZ	0.375 lb ai/a 0.078 lb ai/a	A A		0.0 a	1.3 a	0.8 ef	9.2 a	0.0 a	99.0 a
7	TRICOR VALOR EZ	0.56 lb ai/a 0.078 lb ai/a	A A		0.0 a	0.0 a	2.3 b-e	10.9 a	0.0 a	99.0 a
8	TRICOR ZIDUA SC	0.375 lb ai/a 0.114 lb ai/a	A A		0.0 a	2.0 a	1.5 def	10.1 a	0.0 a	99.0 a
9	TRICOR ZIDUA SC	0.56 lb ai/a 0.114 lb ai/a	A A		0.0 a	5.0 a	2.6 bcd	9.7 a	0.0 a	99.0 a
10	VALOR EZ ZIDUA SC	0.078 lb ai/a 0.114 lb ai/a	A A		0.0 a	1.8 a	3.0 bcd	9.9 a	0.0 a	98.8 a
11	TRICOR VALOR EZ ZIDUA SC	0.375 lb ai/a 0.078 lb ai/a 0.114 lb ai/a	A A A		0.0 a	5.0 a	2.9 bcd	10.3 a	0.0 a	99.0 a
12	TRICOR VALOR EZ ZIDUA SC	0.56 lb ai/a 0.078 lb ai/a 0.114 lb ai/a	A A A		0.0 a	0.0 a	3.5 abc	10.4 a	0.0 a	99.0 a
13	SURVEIL	0.105 lb ai/a	A		0.0 a	0.0 a	1.5 def	9.3 a	0.0 a	98.5 ab
14	TRICOR SURVEIL	0.375 lb ai/a 0.105 lb ai/a	A A		0.0 a	0.0 a	3.0 bcd	10.6 a	0.0 a	99.0 a
15	TRICOR SURVEIL	0.56 lb ai/a 0.105 lb ai/a	A A		0.0 a	0.0 a	3.5 abc	10.3 a	0.0 a	99.0 a
16	TRICOR SURVEIL ZIDUA SC	0.375 lb ai/a 0.105 lb ai/a 0.114 lb ai/a	A A A		0.0 a	0.0 a	3.0 bcd	9.7 a	0.0 a	99.0 a
17	TRICOR SURVEIL ZIDUA SC	0.56 lb ai/a 0.105 lb ai/a 0.114 lb ai/a	A A A		0.0 a	1.8 a	5.3 a	9.7 a	0.0 a	99.0 a
18	FIERCE MTZ	0.413 lb ai/a	A		0.0 a	0.0 a	3.0 bcd	10.4 a	0.0 a	99.0 a
19	FIERCE MTZ TRICOR	0.413 lb ai/a 0.141 lb ai/a	A A		0.0 a	0.0 a	4.0 ab	9.9 a	0.0 a	99.0 a
20	FIERCE MTZ TRICOR	0.413 lb ai/a 0.326 lb ai/a	A A		0.0 a	1.3 a	3.0 bcd	10.0 a	0.0 a	99.0 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.

Due to missing data, larger LSD values (col. 5: >=1.79 and <=2.06) are used for mean comparisons of treatment pairs with missing data.

\* Adjusted means

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

^Calculated from residual.

Rating Date	May-25-2023	Jun-1-2023	Jun-8-2023	Jun-8-2023	Jun-22-2023	May-25-2023
Rating Type	PHYGEN	PHYGEN	PHYGEN	HEIGHT	PHYGEN	CONTRO
Rating Unit	%	%	%	cm	%	%
Crop Scientific Name	Glycine max					
Crop Name	Soybean	Soybean	Soybean	Soybean	Soybean	
Pest Scientific Name						Amaranthus tube>
Pest Name						waterhemp, tall
Trt Treatment	1*	3*	5*	6*	15*	2*
No. Name						
Rate						
Unit						
Appl Code						
21 NONTREATED	0.0 a	0.0 a	0.0 f	9.4 a	0.0 a	0.0 d
LSD P=.05	.	4.36	1.79	1.31	.	0.58
Standard Deviation	0.00	3.08	1.26	0.92	0.00	0.41
CV	0.0	336.33	55.6	9.21	0.0	0.46
Levene's Prob(F)	.	0.965	0.043*	0.648	.	0.00*
P(Shapiro-Wilk)^	.	0.0*	0.0*	0.6275	.	0.0*
P(Skewness)^	.	0.0*	0.0001*	0.5981	.	0.0462*
P(Kurtosis)^	.	0.0*	0.0*	0.9122	.	0.0*
Replicate F	0.000	6.224	0.452	27.865	0.000	2.554
Replicate Prob(F)	1.0000	0.0009	0.7169	0.0001	1.0000	0.0638
Treatment F	0.000	0.992	4.956	1.204	0.000	21262.176
Treatment Prob(F)	1.0000	0.4838	0.0001	0.2831	1.0000	0.0001

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Rating Date			Jun-1-2023	Jun-8-2023	Jun-22-2023
Rating Type			CONTRO	CONTRO	CONTRO
Rating Unit			%	%	%
Crop Scientific Name					
Crop Name					
Pest Scientific Name			Amaranthus tube>	Amaranthus tube>	Amaranthus tube>
Pest Name			waterhemp, tall	waterhemp, tall	waterhemp, tall
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	4*	7*	16*
1 NONTREATED			0.0 e	0.0 f	0.0 i
2 TRICOR	0.375 lb ai/a A		97.0 bc	94.5 bc	87.0 ef
3 TRICOR	0.56 lb ai/a A		98.3 ab	96.3 abc	95.5 abc
4 VALOR EZ	0.078 lb ai/a A		94.0 d	82.5 e	64.3 h
5 ZIDUA SC	0.114 lb ai/a A		96.3 c	86.5 d	72.5 g
6 TRICOR	0.375 lb ai/a A		98.3 ab	97.0 ab	91.3 cde
VALOR EZ	0.078 lb ai/a A				
7 TRICOR	0.56 lb ai/a A		98.0 ab	96.5 ab	93.0 bcd
VALOR EZ	0.078 lb ai/a A				
8 TRICOR	0.375 lb ai/a A		98.8 a	98.5 a	96.5 abc
ZIDUA SC	0.114 lb ai/a A				
9 TRICOR	0.56 lb ai/a A		99.0 a	99.0 a	98.8 a
ZIDUA SC	0.114 lb ai/a A				
10 VALOR EZ	0.078 lb ai/a A		98.0 ab	97.0 ab	89.3 de
ZIDUA SC	0.114 lb ai/a A				
11 TRICOR	0.375 lb ai/a A		98.5 ab	97.5 ab	96.8 ab
VALOR EZ	0.078 lb ai/a A				
ZIDUA SC	0.114 lb ai/a A				
12 TRICOR	0.56 lb ai/a A		99.0 a	99.0 a	98.3 ab
VALOR EZ	0.078 lb ai/a A				
ZIDUA SC	0.114 lb ai/a A				
13 SURVEIL	0.105 lb ai/a A		98.0 ab	93.0 c	83.8 f
14 TRICOR	0.375 lb ai/a A		98.5 ab	98.3 a	94.8 abc
SURVEIL	0.105 lb ai/a A				
15 TRICOR	0.56 lb ai/a A		99.0 a	98.5 a	96.3 abc
SURVEIL	0.105 lb ai/a A				
16 TRICOR	0.375 lb ai/a A		99.0 a	98.8 a	96.5 abc
SURVEIL	0.105 lb ai/a A				
ZIDUA SC	0.114 lb ai/a A				
17 TRICOR	0.56 lb ai/a A		98.5 ab	98.3 a	98.0 ab
SURVEIL	0.105 lb ai/a A				
ZIDUA SC	0.114 lb ai/a A				
18 FIERCE MTZ	0.413 lb ai/a A		98.5 ab	97.8 ab	95.5 abc
19 FIERCE MTZ	0.413 lb ai/a A		99.0 a	98.5 a	97.0 ab
TRICOR	0.141 lb ai/a A				
20 FIERCE MTZ	0.413 lb ai/a A		99.0 a	99.0 a	99.0 a
TRICOR	0.326 lb ai/a A				

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

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Rating Date	Jun-1-2023	Jun-8-2023	Jun-22-2023
Rating Type	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%
Crop Scientific Name			
Crop Name			
Pest Scientific Name	Amaranthus tube>	Amaranthus tube>	Amaranthus tube>
Pest Name	waterhemp, tall	waterhemp, tall	waterhemp, tall
Trt Treatment	4*	7*	16*
No. Name			
Rate			
Unit			
Appl Code			
21 NONTREATED	0.0 e	0.0 f	0.0 i
LSD P=.05	1.50	3.32	5.29
Standard Deviation	1.06	2.35	3.74
CV	1.2	2.7	4.51
Levene's Prob(F)	0.003*	0.096	0.00*
P(Shapiro-Wilk)^	0.0*	0.0*	0.044*
P(Skewness)^	0.0668	0.6638	0.6745
P(Kurtosis)^	0.0*	0.0*	0.1375
Replicate F	2.152	1.886	1.085
Replicate Prob(F)	0.1031	0.1415	0.3626
Treatment F	3092.899	619.737	239.957
Treatment Prob(F)	0.0001	0.0001	0.0001

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Due to missing data, larger LSD values (col. 5: >=1.79 and <=2.06) are used for mean comparisons of treatment pairs with missing data.

\* Adjusted means

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

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## USB Metribuzin Tank-mix Trial

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Protocol ID: 23-USB-Metribuzin Location: Trial Year: 2023  
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Study Director: Sponsor Contact:  
Investigator: Bryan Young

### Rating Type

PHYGEN = phytotoxicity - general / injury

HEIGHT = height

CONTRO = control / burndown or knockdown

### Rating Unit

%, 0, 100, = percent

cm, , , = centimeter