

Benefits of cereal rye and residual herbicides for waterhemp control

Trial ID: NTS06-25
 Conducted: Shiawassee Co. (Durand)

Study Dir.: Stiles, Sprague
 Investigator: Christy Sprague

Planting Date: Apr-29-2025
Variety: P23282E
Population: 150000 S/A
Soil Type: SCL sandy clay loam
Plot Size: 10 X 30 FT

Row Spacing: 30 IN
No. of Reps: 4
% OM: 2.2
pH: 7.2
Study Design: Randomized Complete Block (RCB)

Tillage/Previous Crops: No-Till

Fertilizer:

Crop and Weed Description

Weed	Code	Common Name	Scientific Name
1	AMATU	tall waterhemp	Amaranthus tuberculatus
Crop	Code	Common Name	
1	GLXMA	Soybean	

Application Description

	A	B	C
Application Timing:	ATPLAN	VE-VC	POST V4
Date Treated:	Apr-29-2025	May-12-2025	Jun-24-2025
Time Treated:	8:30 PM	8:30 PM	9:15 AM
% Cloud Cover:	10	10	14
Air Temp., Unit:	70 F	70 F	82 F
% Relative Humidity:	63	58	73
Wind Speed/Unit/Dir:	4 MPH SSW	7 MPH SE	4 MPH W
Soil Temp, Unit:	55 F	68 F	80 F
Leaf Moist/Dew Presence (Y/N):	N		N
Soil Moist:	5	4	5

Crop Stage at Each Application

	A	B	C
Crop 1 Name:	GLXMA	GLXMA	GLXMA
Height:		1-2 " (1.5)	10-12 " (11)
Stage:		VE-VC	V3

Weed Stage at Each Application

	A	B	C
Weed 1 Name:	AMATU	AMATU	AMATU
Height:			1-8 " (4)
Stage:			4-10L

Weed Density

	1
Date:	Jun-24-2025
Weed Name:	AMATU
Density:	10 FT2

Application Equipment

Appl	Sprayer Type	Ground Speed	Nozzle Type	Nozzle Size	Nozzle Height	Nozzle Spacing	Boom Width	Spray Volume	Carrier	Operation Pressure
A	CUB	3.8 MPH	AIXR	11003	20.0 "	20.0 "	120.0 "	19 GAL/AC	WATER	30 PSI
B	CUB	3.8 MPH	AIXR	11003	20.0 "	20.0 "	120.0 "	19 GAL/AC	WATER	30 PSI
C	CUB	3.8 MPH	AIXR	11003	30.0 "	20.0 "	120.0 "	19 GAL/AC	WATER	30 PSI

Comments: Wheeler cereal rye planted on 10/21/24 at 60 lb/A 4-29-25 Cereal rye was at Zadok 24 and 9" tall. 5-12-25 Cereal rye was at Zadok 30 and 15" tall. Waterhemp was resistant to glyphosate (Group 9) and ALS-inhibitors (Group 2)

Michigan State University

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Study Director: Stiles, Sprague Sponsor Contact:

Investigator: Christy Sprague

Rating Date					Jun-9-2025	Jun-9-2025	Jun-24-2025	Jun-24-2025	Jul-22-2025	Jul-22-2025
Rating Type					injury	control	injury	control	injury	control
Rating Unit					%	%	%	%	%	%
Crop Type, Code					C, GLXMA	AMATU	C, GLXMA	AMATU	C, GLXMA	AMATU
Pest Code										
Treatment Appl. Interval					28 DA-B	28 DA-B	0 DA-C	0 DA-C	28 DA-C	28 DA-C
Number of Decimals					0	0	0	0	0	0
Trt No.	Treatment Name	Rate	Unit	Appl Code	Appl Timing					
1	Roundup PowerMax 3 AMS	30 fl oz/a	A	AT PLANT		0	0	0	0	0
2	Roundup PowerMax 3 AMS	17 lb/100 gal	A	AT PLANT		0	0	0	0	69
	Liberty	32 fl oz/a	C	POST (V4)						
	Enlist One	32 fl oz/a	C	POST (V4)						
	Roundup PowerMax 3 AMS	30 fl oz/a	C	POST (V4)						
3	Flexstar	1 pt/a	A	AT PLANT		0	100	0	94	67
	Zidua SC	3.5 fl oz/a	A	AT PLANT						
	Roundup PowerMax 3 AMS	30 fl oz/a	A	AT PLANT						
4	Flexstar	1 pt/a	A	AT PLANT		0	100	0	91	80
	Zidua SC	3.5 fl oz/a	A	AT PLANT						
	Roundup PowerMax 3 AMS	30 fl oz/a	A	AT PLANT						
	Liberty	32 fl oz/a	C	POST (V4)						
	Enlist One	32 fl oz/a	C	POST (V4)						
	Roundup PowerMax 3 AMS	30 fl oz/a	C	POST (V4)						
5	Roundup PowerMax 3 AMS	17 lb/100 gal	C	POST (V4)						
6	Roundup PowerMax 3 AMS	30 fl oz/a	B	~30" (VE-VC)		0	85	0	65	18
	AMS	17 lb/100 gal	B	~30" (VE-VC)						
7	Roundup PowerMax 3 AMS	30 fl oz/a	B	~30" (VE-VC)		0	85	0	58	71
	AMS	17 lb/100 gal	B	~30" (VE-VC)						
	Liberty	32 fl oz/a	C	POST (V4)						
	Enlist One	32 fl oz/a	C	POST (V4)						
	Roundup PowerMax 3 AMS	30 fl oz/a	C	POST (V4)						
8	Roundup PowerMax 3 AMS	17 lb/100 gal	C	POST (V4)						
9	Flexstar	1 pt/a	B	~30" (VE-VC)		0	100	0	99	93
	Zidua SC	3.5 fl oz/a	B	~30" (VE-VC)						
	Roundup PowerMax 3 AMS	30 fl oz/a	B	~30" (VE-VC)						
10	Flexstar	1 pt/a	A	AT PLANT		0	100	0	100	90
	Zidua SC	3.5 fl oz/a	A	AT PLANT						
	Roundup PowerMax 3 AMS	30 fl oz/a	B	~30" (VE-VC)						
	AMS	17 lb/100 gal	B	~30" (VE-VC)						
	Flexstar	1 pt/a	A	AT PLANT		0	100	0	99	93
	Zidua SC	3.5 fl oz/a	A	AT PLANT						
	Roundup PowerMax 3 AMS	30 fl oz/a	B	~30" (VE-VC)						
	AMS	17 lb/100 gal	B	~30" (VE-VC)						
	Liberty	32 fl oz/a	C	POST (V4)						
	Enlist One	32 fl oz/a	C	POST (V4)						
	Roundup PowerMax 3 AMS	30 fl oz/a	C	POST (V4)						
	AMS	17 lb/100 gal	C	POST (V4)						

Missing data estimates are included in columns: Average=8,9

Could not calculate LSD (% mean diff) or mean separation letters for columns 1,3,5 because error variance is 0.

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Rating Date					Jun-9-2025	Jun-9-2025	Jun-24-2025	Jun-24-2025	Jul-22-2025	Jul-22-2025
Rating Type					injury	control	injury	control	injury	control
Rating Unit					%	%	%	%	%	%
Crop Type, Code					C, GLXMA	AMATU	C, GLXMA	AMATU	C, GLXMA	AMATU
Pest Code										
Treatment Appl. Interval					28 DA-B	28 DA-B	0 DA-C	0 DA-C	28 DA-C	28 DA-C
Number of Decimals					0	0	0	0	0	0
Trt No.	Treatment Name	Rate	Unit	Appl Code	Appl Timing					
11	Roundup PowerMax 3	30 fl oz/a	A	A	AT PLANT	0	0	0	10	0
	AMS	17 lb/100 gal	A	A	AT PLANT					81
	Zidua SC	2.5 fl oz/a	C	C	POST (V4)					
	Liberty	32 fl oz/a	C	C	POST (V4)					
	Enlist One	32 fl oz/a	C	C	POST (V4)					
	Roundup PowerMax 3	30 fl oz/a	C	C	POST (V4)					
	AMS	17 lb/100 gal	C	C	POST (V4)					
12	Roundup PowerMax 3	30 fl oz/a	B	B	~30" (VE-VC)	0	84	0	59	0
	AMS	17 lb/100 gal	B	B	~30" (VE-VC)					93
	Zidua SC	2.5 fl oz/a	C	C	POST (V4)					
	Liberty	32 fl oz/a	C	C	POST (V4)					
	Enlist One	32 fl oz/a	C	C	POST (V4)					
	Roundup PowerMax 3	30 fl oz/a	C	C	POST (V4)					
	AMS	17 lb/100 gal	C	C	POST (V4)					
LSD P=.05						.	10.9	.	13.9	13.1
Standard Deviation						0.0	7.6	0.0	9.7	9.1
CV						0.0	10.65	0.0	15.02	13.12

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Protocol ID: NTS06-25 Location: Shiawassee Co. (Durand) Trial Year: 2025

Study Director: Stiles, Sprague Sponsor Contact:

Investigator: Christy Sprague

Rating Date	Oct-10-2025	Oct-17-2025	Oct-17-2025
Rating Type	control	moisture	yield
Rating Unit	%	%	bu/A
Crop Type, Code		C, GLXMA	C, GLXMA
Pest Code	AMATU		
Treatment Appl. Interval	108 DA-C		@13% M
Number of Decimals	0	1	1

Trt No.	Treatment Name	Rate	Unit	Appl Code	Appl Timing			
1	Roundup PowerMax 3 AMS	30 fl oz/a	A	AT PLANT		0	13.3	37.1
2	Roundup PowerMax 3 AMS	17 lb/100 gal	A	AT PLANT		67	13.3	58.3
	Liberty	32 fl oz/a	C	POST (V4)				
	Enlist One	32 fl oz/a	C	POST (V4)				
	Roundup PowerMax 3 AMS	30 fl oz/a	C	POST (V4)				
		17 lb/100 gal	C	POST (V4)				
3	Flexstar	1 pt/a	A	AT PLANT		65	13.2	41.5
	Zidua SC	3.5 fl oz/a	A	AT PLANT				
	Roundup PowerMax 3 AMS	30 fl oz/a	A	AT PLANT				
		17 lb/100 gal	A	AT PLANT				
4	Flexstar	1 pt/a	A	AT PLANT		71	13.2	53.0
	Zidua SC	3.5 fl oz/a	A	AT PLANT				
	Roundup PowerMax 3 AMS	30 fl oz/a	A	AT PLANT				
		17 lb/100 gal	A	AT PLANT				
	Liberty	32 fl oz/a	C	POST (V4)				
	Enlist One	32 fl oz/a	C	POST (V4)				
	Roundup PowerMax 3 AMS	30 fl oz/a	C	POST (V4)				
		17 lb/100 gal	C	POST (V4)				
5	Roundup PowerMax 3 AMS	30 fl oz/a	B	~30" (VE-VC)		15	13.5	45.8
		17 lb/100 gal	B	~30" (VE-VC)				
6	Roundup PowerMax 3 AMS	30 fl oz/a	B	~30" (VE-VC)		76	13.4	55.9
		17 lb/100 gal	B	~30" (VE-VC)				
	Liberty	32 fl oz/a	C	POST (V4)				
	Enlist One	32 fl oz/a	C	POST (V4)				
	Roundup PowerMax 3 AMS	30 fl oz/a	C	POST (V4)				
		17 lb/100 gal	C	POST (V4)				
7	Flexstar	1 pt/a	B	~30" (VE-VC)		78	13.4	51.0
	Zidua SC	3.5 fl oz/a	B	~30" (VE-VC)				
	Roundup PowerMax 3 AMS	30 fl oz/a	B	~30" (VE-VC)				
		17 lb/100 gal	B	~30" (VE-VC)				
8	Flexstar	1 pt/a	B	~30" (VE-VC)		91	13.3	58.8
	Zidua SC	3.5 fl oz/a	B	~30" (VE-VC)				
	Roundup PowerMax 3 AMS	30 fl oz/a	B	~30" (VE-VC)				
		17 lb/100 gal	B	~30" (VE-VC)				
	Liberty	32 fl oz/a	C	POST (V4)				
	Enlist One	32 fl oz/a	C	POST (V4)				
	Roundup PowerMax 3 AMS	30 fl oz/a	C	POST (V4)				
		17 lb/100 gal	C	POST (V4)				
9	Flexstar	1 pt/a	A	AT PLANT		92	13.2	54.8
	Zidua SC	3.5 fl oz/a	A	AT PLANT				
	Roundup PowerMax 3 AMS	30 fl oz/a	B	~30" (VE-VC)				
		17 lb/100 gal	B	~30" (VE-VC)				
10	Flexstar	1 pt/a	A	AT PLANT		92	13.1	61.8
	Zidua SC	3.5 fl oz/a	A	AT PLANT				
	Roundup PowerMax 3 AMS	30 fl oz/a	B	~30" (VE-VC)				
		17 lb/100 gal	B	~30" (VE-VC)				
	Liberty	32 fl oz/a	C	POST (V4)				
	Enlist One	32 fl oz/a	C	POST (V4)				
	Roundup PowerMax 3 AMS	30 fl oz/a	C	POST (V4)				
		17 lb/100 gal	C	POST (V4)				

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Investigator: Christy Sprague

Rating Date					Oct-10-2025	Oct-17-2025	Oct-17-2025
Rating Type					control	moisture	yield
Rating Unit					%	%	bu/A
Crop Type, Code						C, GLXMA	C, GLXMA
Pest Code					AMATU		
Treatment Appl. Interval					108 DA-C		@13% M
Number of Decimals					0	1	1
Trt No.	Treatment Name	Rate	Unit	Appl Code	Appl Timing		
11	Roundup PowerMax 3	30 fl oz/a	A	AT PLANT		79	13.6
	AMS	17 lb/100 gal	A	AT PLANT			53.1
	Zidua SC	2.5 fl oz/a	C	POST (V4)			
	Liberty	32 fl oz/a	C	POST (V4)			
	Enlist One	32 fl oz/a	C	POST (V4)			
	Roundup PowerMax 3	30 fl oz/a	C	POST (V4)			
	AMS	17 lb/100 gal	C	POST (V4)			
12	Roundup PowerMax 3	30 fl oz/a	B	~30" (VE-VC)		91	13.3
	AMS	17 lb/100 gal	B	~30" (VE-VC)			60.5
	Zidua SC	2.5 fl oz/a	C	POST (V4)			
	Liberty	32 fl oz/a	C	POST (V4)			
	Enlist One	32 fl oz/a	C	POST (V4)			
	Roundup PowerMax 3	30 fl oz/a	C	POST (V4)			
	AMS	17 lb/100 gal	C	POST (V4)			
LSD P=.05						11.6	0.57
Standard Deviation						8.0	0.39
CV						11.83	2.94
							10.03
							6.92
							13.16

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