

Glyphosate with Acidic AMS Replacement Adjuvants - Hard Water.

Trial ID: 09-11C-W95

Location: Belleville Res. Center

Investigator: Bryan Young, Professor, Southern Illinois University, bgyoung@siu.edu

City State Zip Country: Belleville IL 62221 USA

Trial Status: FINAL Initiation Date: 06-30-09

Objectives: Evaluate the efficacy of acidic AMS replacement adjuvant products with glyphosate in the presence of hard water cations.

Crop 1: GLXMA Soybean	Variety: AG 4404	Description: RR/STS
Planting Method: SEEDED	Planting Date: 06-30-09	
Rate, Unit: 75 LB/A	Depth, Unit: 1.0 IN	
Row Spacing, Unit: 30 IN		

Pest 1 Type: W	Code: ABUTH	Abutilon theophrasti Medicus	velvetleaf
Pest 2 Type: W	Code: IPOHE	Ipomoea hederacea (L.) Jacq.	morningglory, ivyleaf
Pest 3 Type: W	Code: AMATA	Amaranthus rudis Sauer	waterhemp, common
Pest 4 Type: W	Code: SETFA	Setaria faberi Herrm.	foxtail, giant

Plot Width, Unit: 10 FT	Site Type: FIELD
Plot Length, Unit: 27 FT	Tillage Type: REDUCED-TILL
Replications: 3	Study Design: Randomized Complete Block

Prior Crops, Year
1. ZEAMD 2008

Field Prep./Maintenance: N 0 LB/A, P205 50 LB/A, K20 100 LB/A

% OM: 2.3	Texture: SILT LOAM
pH: 5.8	Soil Name: BETHALTO
CEC: 13	Fert. Level: P1 84 LB/A, K 456 LB/A

Application Description

A
Application Date: 07-30-09
Time of Day: 9:15
Application Method: Spray
Application Timing: 6-8"W
Application Placement: BROFOL
Applied By: NVH
Air Temperature, Unit: 73 F
% Relative Humidity: 90
Wind Velocity, Unit: 1 MPH
Dew Presence (Y/N): N
Soil Moisture: NORMAL
% Cloud Cover: 75

07-30-09
Crop stage at application: V4
Height Min, Max (inch): 6 8

Pest Stage At Each Application

Application Date: 07-30-09
Weed Code: ABUTH
Stage Majority (leaves): 4
Stage Min, Max: 2 5
Height Majority: 7 IN
Height Min, Max: 1.5 9
Density, Unit: 0.2 FT2
Weed Code: IPOHE
Stage Majority (leaves): 6
Stage Min, Max: 4 8
Height Majority: 6.5 IN
Height Min, Max: 3.5 8
Density, Unit: 0.5 FT2
Weed Code: AMATA
Stage Majority (leaves): 8
Stage Min, Max: 6 12
Height Majority: 7 IN
Height Min, Max: 3 9
Density, Unit: 15 FT2
Weed Code: SETFA
Stage Majority (leaves): 3
Stage Min, Max: 2 5
Height Majority: 7.5 IN
Height Min, Max: 4 10
Density, Unit: 10 FT2

Application Equipment

Appl. Equipment: CO2 sprayer
Operating Pressure: 30 PSI
Nozzle Type: Flat fan
Nozzle Size: TT 110015
Boom Length, Unit: 7.5 FT
Spray Volume, Unit: 10 GPA

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Pest Code										GLXMA		ABUTH	ABUTH	IPOHE	IPOHE	
Crop Code										07-30-09	08-13-09	08-27-09	08-13-09	08-27-09		
Rating Date										Spray sol.	Injury	Injury	Control	Control	Control	Control
Rating Data Type										pH	Percent	Percent	Percent	Percent	Percent	Percent
Rating Unit										after						
Rating Timing										mixing	14 DAT	28 DAT	14 DAT	28 DAT	14 DAT	28 DAT
Trt-Eval Interval																
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Other Rate	Other Rate Unit	Growth Stage	Appl Code							
1	HARD WATER (1000 PPM)									4.89	0 a	0 a	22 g	22 d	33 g	28 gh
1	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A							
2	HARD WATER (1000 PPM)									5.07	0 a	0 a	38 de	33 c	40 fg	33 fg
2	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A							
2	R-11	100	SL	0.25	% v/v	0.25	% v/v	6-8" W	A							
3	HARD WATER (1000 PPM)									4.93	0 a	0 a	63 ab	60 a	55 bc	51 ab
3	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A							
3	AMS	100	SG	1.02	% w/w	8.5	lb/100 gal	6-8" W	A							
4	HARD WATER (1000 PPM)									4.90	0 a	0 a	53 bc	60 a	60 b	50 b
4	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A							
4	R-11	100	SL	0.25	% v/v	0.25	% v/v	6-8" W	A							
4	AMS	100	SG	1.02	% w/w	8.5	lb/100 gal	6-8" W	A							
5	HARD WATER (1000 PPM)									3.37	0 a	0 a	32 efg	30 cd	42 ef	35 efg
5	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A							
5	CUT RATE	100	SG	0.24	% w/w	2	lb/100 gal	6-8" W	A							
6	HARD WATER (1000 PPM)									3.20	0 a	0 a	32 efg	30 cd	48 cde	42 cde
6	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A							
6	CUT RATE	100	SG	0.48	% w/w	4	lb/100 gal	6-8" W	A							
7	HARD WATER (1000 PPM)									2.80	0 a	0 a	25 fg	22 d	42 ef	37 def
7	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A							
7	HEL-FIRE	100	SL	0.5	% v/v	0.5	% v/v	6-8" W	A							
8	HARD WATER (1000 PPM)									2.32	0 a	0 a	40 de	28 cd	50 cd	45 bc
8	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A							
8	HEL-FIRE	100	SL	1	% v/v	1	% v/v	6-8" W	A							
9	HARD WATER (1000 PPM)									2.09	0 a	0 a	52 c	45 b	52 c	43 bcd
9	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A							
9	IMPORT	100	SL	0.5	% v/v	0.5	% v/v	6-8" W	A							
10	HARD WATER (1000 PPM)									1.89	0 a	0 a	68 a	67 a	70 a	58 a
10	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A							
10	IMPORT	100	SL	1	% v/v	1	% v/v	6-8" W	A							
11	HARD WATER (1000 PPM)									2.54	0 a	0 a	30 efg	30 cd	33 g	23 h
11	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A							
11	CT-301	100	SL	0.0313	% v/v	4	fl oz/100 gal	6-8" W	A							
12	HARD WATER (1000 PPM)									2.26	0 a	0 a	35 ef	30 cd	42 ef	30 fgh
12	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A							
12	CT-301	100	SL	0.0625	% v/v	8	fl oz/100 gal	6-8" W	A							
13	HARD WATER (1000 PPM)									2.47	0 a	0 a	38 de	32 c	42 ef	35 efg
13	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A							
13	ET 4000	100	SL	0.5	% v/v	0.5	% v/v	6-8" W	A							
14	HARD WATER (1000 PPM)									2.15	0 a	0 a	48 cd	43 b	53 bc	43 bcd
14	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A							
14	ET 4000	100	SL	1	% v/v	1	% v/v	6-8" W	A							
15	HARD WATER (1000 PPM)									2.60	0 a	0 a	23 g	22 d	43 def	33 fg
15	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A							
15	N-TENSE	100	SL	0.5	% v/v	0.5	% v/v	6-8" W	A							
16	HARD WATER (1000 PPM)									2.21	0 a	0 a	30 efg	30 cd	50 cd	42 cde
16	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A							
16	N-TENSE	100	SL	1	% v/v	1	% v/v	6-8" W	A							
17	NONTREATED									.	0 a	0 a	0 h	0 e	0 h	0 i
LSD (P=.05)										.	0.0	0.0	10.3	9.9	7.8	8.2
Replicate F											0.000	0.000	1.043	0.285	0.267	4.777
Replicate Prob(F)											1.0000	1.0000	0.3652	0.7539	0.7673	0.0153
Treatment F											0.000	0.000	21.632	23.524	29.694	21.156
Treatment Prob(F)											1.0000	1.0000	0.0001	0.0001	0.0001	0.0001

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

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Pest Code	AMATA	AMATA	SETFA	SETFA
Crop Code				
Rating Date	08-13-09	08-27-09	08-13-09	08-27-09
Rating Data Type	Control	Control	Control	Control
Rating Unit	Percent	Percent	Percent	Percent
Rating Timing				
Trt-Eval Interval	14 DAT	28 DAT	14 DAT	28 DAT

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Other Rate	Other Rate Unit	Growth Stage	Appl Code				
1	HARD WATER (1000 PPM)												
1	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A	22 h	20 jk	40 g	47 g
2	HARD WATER (1000 PPM)												
2	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A	42 ef	33 f-i	90 c	90 c
2	R-11	100	SL	0.25	% v/v	0.25	% v/v	6-8" W	A				
3	HARD WATER (1000 PPM)												
3	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A	60 c	57 bc	94 b	95 abc
3	AMS	100	SG	1.02	% w/w	8.5	lb/100 gal	6-8" W	A				
4	HARD WATER (1000 PPM)												
4	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A	73 b	60 b	99 a	98 a
4	R-11	100	SL	0.25	% v/v	0.25	% v/v	6-8" W	A				
4	AMS	100	SG	1.02	% w/w	8.5	lb/100 gal	6-8" W	A				
5	HARD WATER (1000 PPM)												
5	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A	42 ef	30 g-k	73 e	76 e
5	CUT RATE	100	SG	0.24	% w/w	2	lb/100 gal	6-8" W	A				
6	HARD WATER (1000 PPM)												
6	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A	48 de	37 e-h	74 e	77 e
6	CUT RATE	100	SG	0.48	% w/w	4	lb/100 gal	6-8" W	A				
7	HARD WATER (1000 PPM)												
7	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A	58 cd	42 d-g	97 ab	97 ab
7	HEL-FIRE	100	SL	0.5	% v/v	0.5	% v/v	6-8" W	A				
8	HARD WATER (1000 PPM)												
8	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A	58 cd	45 c-f	97 ab	98 a
8	HEL-FIRE	100	SL	1	% v/v	1	% v/v	6-8" W	A				
9	HARD WATER (1000 PPM)												
9	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A	76 ab	53 bcd	99 a	99 a
9	IMPORT	100	SL	0.5	% v/v	0.5	% v/v	6-8" W	A				
10	HARD WATER (1000 PPM)												
10	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A	87 a	73 a	99 a	99 a
10	IMPORT	100	SL	1	% v/v	1	% v/v	6-8" W	A				
11	HARD WATER (1000 PPM)												
11	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A	27 gh	23 ijk	65 f	68 f
11	CT-301	100	SL	0.0313	% v/v	4	fl oz/100 gal	6-8" W	A				
12	HARD WATER (1000 PPM)												
12	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A	20 h	18 k	63 f	65 f
12	CT-301	100	SL	0.0625	% v/v	8	fl oz/100 gal	6-8" W	A				
13	HARD WATER (1000 PPM)												
13	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A	35 fg	25 h-k	83 d	83 d
13	ET 4000	100	SL	0.5	% v/v	0.5	% v/v	6-8" W	A				
14	HARD WATER (1000 PPM)												
14	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A	47 e	35 e-i	86 d	91 bc
14	ET 4000	100	SL	1	% v/v	1	% v/v	6-8" W	A				
15	HARD WATER (1000 PPM)												
15	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A	47 e	33 f-j	90 c	95 abc
15	N-TENSE	100	SL	0.5	% v/v	0.5	% v/v	6-8" W	A				
16	HARD WATER (1000 PPM)												
16	TOUCHDOWN HI-TECH	5	SL	0.28	lb ae/a	7.2	fl oz/a	6-8" W	A	52 cde	47 cde	99 a	98 a
16	N-TENSE	100	SL	1	% v/v	1	% v/v	6-8" W	A				
17	NONTREATED									0 i	0 l	0 h	0 h
LSD (P=.05)										11.4	13.1	3.7	6.2

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Pest Code	AMATA	AMATA	SETFA	SETFA
Crop Code				
Rating Date	08-13-09	08-27-09	08-13-09	08-27-09
Rating Data Type	Control	Control	Control	Control
Rating Unit	Percent	Percent	Percent	Percent
Rating Timing				
Trt-Eval Interval	14 DAT	28 DAT	14 DAT	28 DAT

Trt No.	Treatment Name	Form Conc	Form Type	Rate Rate	Unit Unit	Other Rate	Other Rate Unit	Growth Stage	Appl Code
Replicate F									
Replicate Prob(F)									
Treatment F									
Treatment Prob(F)									

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

Trial Comments

1. Protocol: NDSU/UNL/KSU/SIU.
2. Ratings: WC at 14 & 28 DAT.
3. Measure and record spray solution pH after mixing.
4. Special mixing instructions: Use hardwater.
HARD WATER MIXING INSTRUCTIONS:
To make 3 gallons of 1000 ppm Ca + Mg hard water use the formula:
13.45 g of CaCl₂-2H₂O (Calcium Chloride Dihydrate)
4.62 g of MgCl₂-6H₂O (Magnesium Chloride Hexahydrate)
3 gallons distilled water
Be sure to use the dihydrate form of the calcium chloride and the hexahydrate form of the magnesium chloride.
Be sure to stir in the salts to insure that the solutions are all homogeneous before use.
5. Spray sol. = Spray solution after mixing.
6. Not harvested.