

# Adjuvant Studies, Corn or Soybean

Southern Illinois University

AMS Replacements with Glyphosate.

Trial ID: 11-10B-MW100

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:** 6-7-11

**Objectives:** Evaluate the efficacy of experimental adjuvant replacements for ammonium sulfate with Touchdown HiTech and Roundup PowerMax

**Crop 1:** GLXMA Soybean **Variety:** AG 4005 **Description:** RR  
**Planting Method:** SEEDED **Planting Date:** 6-7-11  
**Rate, Unit:** 75 LB/A **Depth, Unit:** 1.0 IN  
**Row Spacing, Unit:** 30 IN

**Pest 1 Type:** W **Code:** SETFA **Setaria faberi** Herrm. foxtail, giant  
**Pest 2 Type:** W **Code:** AMBTR **Ambrosia trifida** L. ragweed, giant  
**Pest 3 Type:** W **Code:** ABUTH **Abutilon theophrasti** Medicus velvetleaf  
**Pest 4 Type:** W **Code:** IPOSS morningglory, species  
**Pest Description:** Mixture of IPOHE and IPOLA

**Plot Width, Unit:** 10 FT **Site Type:** FIELD  
**Plot Length, Unit:** 24 FT **Tillage Type:** REDUCED-TILL  
**Replications:** 3 **Study Design:** Randomized Complete Block

**Prior Crops, Year**  
1. ZEAMD 2010

**Field Prep./Maintenance:** N 0 LB/A, P205 0 LB/A, K20 150 LB/A

**% OM:** 2 **Texture:** SILT LOAM  
**pH:** 6.1 **Soil Name:** PIERRON  
**CEC:** 9 **Fert. Level:** P1: 82 LB/A, K: 312 LB/A

## Application Description

**A**  
**Application Date:** 7-6-11  
**Time of Day:** 10:00  
**Application Method:** Spray  
**Application Timing:** 4-6"W  
**Application Placement:** BROFOL  
**Applied By:** JRK  
**Air Temperature, Unit:** 85 F  
**% Relative Humidity:** 70  
**Wind Velocity, Unit:** 0 MPH  
**Dew Presence (Y/N):** N  
**Soil Temperature, Unit:** 79 F  
**Soil Moisture:** ABONOR  
**% Cloud Cover:** 50

**Crop stage at application:** 6-7-11  
V3-V4  
**Height Min, Max (inch):** 5 9

## Pest Stage At Each Application

**Application Date:** 7-6-11  
**Weed Code:** SETFA  
**Stage Majority (leaves):** 4  
**Stage Min, Max:** 1 6  
**Height Majority:** 4 IN  
**Height Min, Max:** 1 9  
**Density, Unit:** 0.3 FT2  
**Weed Code:** AMBTR  
**Stage Majority (leaves):** 6  
**Stage Min, Max:** 2 12  
**Height Majority:** 5 IN  
**Height Min, Max:** 2 9  
**Density, Unit:** 0.3 FT2  
**Weed Code:** ABUTH  
**Stage Majority (leaves):** 3  
**Stage Min, Max:** 2 4  
**Height Majority:** 2 IN  
**Height Min, Max:** 1 5  
**Density, Unit:** 0.1 FT2  
**Weed Code:** IPOSS  
**Stage Majority (leaves):** 4  
**Stage Min, Max:** 2 6  
**Height Majority:** 3 IN  
**Height Min, Max:** 1 4  
**Density, Unit:** 0.1 FT2

AMS Replacements with Glyphosate.

Trial ID: 11-10B-MW100

Location: Belleville Res. Center

**Application Equipment**

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

Southern Illinois University

AMS Replacements with Glyphosate.

Trial ID: 11-10B-MW100

Location: Belleville Res. Center

Pest Code		Crop Code		Rating Date		Rating Data Type		Rating Unit		Rating Timing		Trt-Eval Interval		GLXMA	GLXMA	SETFA	SETFA	AMBTR	AMBTR	ABUTH	ABUTH
														7-20-11	8-3-11	7-20-11	8-3-11	7-20-11	8-3-11	7-20-11	8-3-11
														Injury	Injury	Control	Control	Control	Control	Control	Control
														Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
														14 DA-A	28 DA-A	14 DA-A	28 DA-A	14 DA-A	28 DA-A	14 DA-A	28 DA-A
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Other Rate	Other Rate Unit	Growth Stage	Appl Code												
1	NONTREATED									0 a	0 a	0 e	0 c	0 d	0 c	0 e	0 e				
2	HARD WATER (500 PPM)									0 a	0 a	92 d	97 ab	78 c	85 ab	25 d	23 cd				
2	TOUCHDOWN HI-TECH	5	SL	0.375	lb ae/a	9.6	fl oz/a	4-6"W	A												
3	HARD WATER (500 PPM)									0 a	0 a	95 c	96 ab	85 ab	82 ab	38 bc	35 ab				
3	TOUCHDOWN HI-TECH	5	SL	0.375	lb ae/a	9.6	fl oz/a	4-6"W	A												
3	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	4-6"W	A												
4	HARD WATER (500 PPM)									0 a	0 a	98 ab	99 ab	81 bc	83 ab	35 c	25 bcd				
4	TOUCHDOWN HI-TECH	5	SL	0.375	lb ae/a	9.6	fl oz/a	4-6"W	A												
4	CLASS ACT NG	100	SL	2.5	% v/v	2.5	% v/v	4-6"W	A												
5	HARD WATER (500 PPM)									0 a	0 a	98 ab	98 ab	82 abc	87 ab	28 d	23 cd				
5	TOUCHDOWN HI-TECH	5	SL	0.375	lb ae/a	9.6	fl oz/a	4-6"W	A												
5	AG 8034	100	SL	2	% v/v	2	% v/v	4-6"W	A												
6	HARD WATER (500 PPM)									0 a	0 a	96 bc	99 a	83 abc	83 ab	35 c	20 d				
6	TOUCHDOWN HI-TECH	5	SL	0.375	lb ae/a	9.6	fl oz/a	4-6"W	A												
6	CLASS ACT NG	100	SL	1.25	% v/v	1.25	% v/v	4-6"W	A												
7	HARD WATER (500 PPM)									0 a	0 a	98 ab	99 a	86 ab	90 ab	40 abc	35 ab				
7	TOUCHDOWN HI-TECH	5	SL	0.375	lb ae/a	9.6	fl oz/a	4-6"W	A												
7	AG 8034	100	SL	1	% v/v	1	% v/v	4-6"W	A												
8	HARD WATER (500 PPM)									0 a	0 a	98 ab	97 ab	82 abc	89 ab	38 abc	35 ab				
8	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A												
9	HARD WATER (500 PPM)									0 a	0 a	98 a	98 ab	87 a	92 ab	45 a	43 a				
9	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A												
9	AMS	100	SG	1.02	% w/w	8.5	lb/100 gal	4-6"W	A												
10	HARD WATER (500 PPM)									0 a	0 a	98 ab	99 a	87 a	93 a	43 ab	35 ab				
10	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A												
10	AMS	100	SG	2.04	% w/w	17	lb/100 gal	4-6"W	A												
11	HARD WATER (500 PPM)									0 a	0 a	97 abc	99 a	86 ab	92 ab	37 bc	37 ab				
11	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A												
11	CHEMPRO CP-20	100	SL	0.125	% v/v	1	pt/100 gal	4-6"W	A												
12	HARD WATER (500 PPM)									0 a	0 a	97 abc	98 ab	85 ab	88 ab	35 c	33 abc				
12	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A												
12	CHEMPRO CP-40	100	SL	0.5	% v/v	4	pt/100 gal	4-6"W	A												
13	HARD WATER (500 PPM)									0 a	0 a	97 abc	98 ab	85 ab	90 ab	38 abc	40 a				
13	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A												
13	CHM20111	100	SL	0.5	% v/v	4	pt/100 gal	4-6"W	A												
14	HARD WATER (500 PPM)									0 a	0 a	98 ab	98 ab	82 abc	81 b	38 abc	38 a				
14	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A												
14	CHM20112	100	SL	0.375	% v/v	3	pt/100 gal	4-6"W	A												
15	HARD WATER (500 PPM)									0 a	0 a	97 abc	98 ab	85 ab	89 ab	37 bc	33 abc				
15	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A												
15	CHM20113	100	SL	0.375	% v/v	3	pt/100 gal	4-6"W	A												
16	HARD WATER (500 PPM)									0 a	0 a	97 abc	95 b	86 ab	87 ab	37 bc	37 ab				
16	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A												
16	CHM20114	100	SL	0.25	% v/v	2	pt/100 gal	4-6"W	A												
LSD (P=.05)										0.0	0.0	2.1	3.2	5.5	12.0	7.3	12.1				
Replicate F										0.000	0.000	0.348	1.385	0.964	2.348	3.582	2.928				
Replicate Prob(F)										1.0000	1.0000	0.7091	0.2676	0.3929	0.1128	0.0450	0.0746				
Treatment F										0.000	0.000	1084.843	487.241	121.108	28.517	17.370	6.602				
Treatment Prob(F)										1.0000	1.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001				

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

## AMS Replacements with Glyphosate.

Trial ID: 11-10B-MW100

Location: Belleville Res. Center

Pest Code	IPOSS	IPOSS
Crop Code		
Rating Date	7-20-11	8-3-11
Rating Data Type	Control	Control
Rating Unit	Percent	Percent
Rating Timing		
Trt-Eval Interval	14 DA-A	28 DA-A

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Other Rate	Other Rate Unit	Growth Stage	Appl Code		
1	NONTREATED									0 d	0 d
2	HARD WATER (500 PPM)									42 bc	40 c
2	TOUCHDOWN HI-TECH	5	SL	0.375	lb ae/a	9.6	fl oz/a	4-6"W	A		
3	HARD WATER (500 PPM)									55 a	52 abc
3	TOUCHDOWN HI-TECH	5	SL	0.375	lb ae/a	9.6	fl oz/a	4-6"W	A		
3	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	4-6"W	A		
4	HARD WATER (500 PPM)									52 ab	53 abc
4	TOUCHDOWN HI-TECH	5	SL	0.375	lb ae/a	9.6	fl oz/a	4-6"W	A		
4	CLASS ACT NG	100	SL	2.5	% v/v	2.5	% v/v	4-6"W	A		
5	HARD WATER (500 PPM)									48 abc	55 ab
5	TOUCHDOWN HI-TECH	5	SL	0.375	lb ae/a	9.6	fl oz/a	4-6"W	A		
5	AG 8034	100	SL	2	% v/v	2	% v/v	4-6"W	A		
6	HARD WATER (500 PPM)									48 abc	47 abc
6	TOUCHDOWN HI-TECH	5	SL	0.375	lb ae/a	9.6	fl oz/a	4-6"W	A		
6	CLASS ACT NG	100	SL	1.25	% v/v	1.25	% v/v	4-6"W	A		
7	HARD WATER (500 PPM)									55 a	53 abc
7	TOUCHDOWN HI-TECH	5	SL	0.375	lb ae/a	9.6	fl oz/a	4-6"W	A		
7	AG 8034	100	SL	1	% v/v	1	% v/v	4-6"W	A		
8	HARD WATER (500 PPM)									57 a	58 a
8	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A		
9	HARD WATER (500 PPM)									54 a	58 a
9	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A		
9	AMS	100	SG	1.02	% w/w	8.5	lb/100 gal	4-6"W	A		
10	HARD WATER (500 PPM)									55 a	60 a
10	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A		
10	AMS	100	SG	2.04	% w/w	17	lb/100 gal	4-6"W	A		
11	HARD WATER (500 PPM)									38 c	43 bc
11	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A		
11	CHEMPRO CP-20	100	SL	0.125	% v/v	1	pt/100 gal	4-6"W	A		
12	HARD WATER (500 PPM)									43 bc	48 abc
12	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A		
12	CHEMPRO CP-40	100	SL	0.5	% v/v	4	pt/100 gal	4-6"W	A		
13	HARD WATER (500 PPM)									52 ab	55 ab
13	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A		
13	CHM20111	100	SL	0.5	% v/v	4	pt/100 gal	4-6"W	A		
14	HARD WATER (500 PPM)									52 ab	53 abc
14	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A		
14	CHM20112	100	SL	0.375	% v/v	3	pt/100 gal	4-6"W	A		
15	HARD WATER (500 PPM)									48 abc	47 abc
15	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A		
15	CHM20113	100	SL	0.375	% v/v	3	pt/100 gal	4-6"W	A		
16	HARD WATER (500 PPM)									55 a	55 ab
16	ROUNDUP POWERMAX	4.5	SL	0.375	lb ae/a	10.7	fl oz/a	4-6"W	A		
16	CHM20114	100	SL	0.25	% v/v	2	pt/100 gal	4-6"W	A		
LSD (P=.05)										10.1	14.8
Replicate F										23.322	14.764
Replicate Prob(F)										0.0001	0.0001
Treatment F										15.200	7.581
Treatment Prob(F)										0.0001	0.0001

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

AMS Replacements with Glyphosate.

Trial ID: 11-10B-MW100

Location: Belleville Res. Center

Trial Comments

1. Protocol: Winfield Solutions, Chemorse.
2. Ratings: CI/WC 14 and 28 DAT.
3. Mixing order: Water (at least 75% of the water), Adjuvant (water conditioner), Herbicide.
4. Mixing: Use hardwater (500 PPM).

HARD WATER (500 PPM) = Ca + Mg hard water.

HARD WATER MIXING INSTRUCTIONS:

To make 1 gallon of 500 ppm Ca + Mg hard water use the formula:

2.24 g of  $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$  (Calcium Chloride Dihydrate)

0.77 g of  $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$  (Magnesium Chloride Hexahydrate)

1 gallon 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. IPOSS = Morningglory species including IPOHE (ivyleaf morningglory) and IPOLA (pitted morningglory).
6. Missing data was due to low population of some species in some plots.