

MSU Weed Science Research Program

Evaluation of adjuvants with glyphosate tank-mixtures in soybean

Trial ID: SOY16-13  
Conducted: Campus B-9

Study Dir.: Sprague, Powell  
Investigator: Christy Sprague

**Date Planted:** Jun/08/2013      **Row Spacing:** 30 IN  
**Variety:** Pioneer 92Y51      **No. of Reps:** 4  
**Population:** 156,000 seeds/A      **% OM:** 3.5  
**Soil Type:** Sandy Clay Loam      **pH:** 7.2  
**Plot Size:** 10 X 30 FT      **Design:** RANDOMIZED COMPLETE BLOCK

**Tillage:** Fall chisel, spring soil finish  
**Fertilizer:** None

**Crop and Weed Description**

| Weed | Code  | Common Name            | Scientific Name             |
|------|-------|------------------------|-----------------------------|
| 1.   | ANGR  | mainly foxtail species | SETARIA SP.                 |
| 2.   | AMBEL | RAGWEED, COMMON        | AMBROSIA ARTEMISIIFOLIA L.  |
| 3.   | ABUTH | VELVETLEAF             | ABUTILON THEOPHRASTI MEDIK. |
| Crop | Code  | Common Name            |                             |
| 1.   | GLXMA | SOYBEAN                |                             |

**Application Description**

**Application Timing:** A  
POST  
**Date Treated:** Jun/19/2013  
**Time Treated:** 10:30 AM  
**% Cloud Cover:** 0  
**Air Temp., Unit:** 70 F  
**% Relative Humidity:** 47  
**Wind Speed/Unit/Dir:** 4 mph NE  
**Soil Temp., Unit:** 60 F  
**Soil/Leaf Surface M:** 2 4  
**Soil Moist (1=w 5=d):** 2

**Crop Stage at Each Application**

**Crop Name:** A  
GLXMA  
**Height (In.):** 7"  
**Stage (L):** V3

**Weed Stage at Each Application**

**Weed 1 Name:** A  
ANGR  
**Height (In.):** 3"  
**Stage (L):** 3  
**Weed 2 Name:** AMBEL  
**Height (In.):** 4"  
**Stage (L):** many  
**Weed 3 Name:** ABUTH  
**Height (In.):** 3"  
**Stage (L):** 6

**Weed Density (plants/sq. ft.)**

| Date:             | 1           | 2           | 3           |
|-------------------|-------------|-------------|-------------|
|                   | Jul/11/2013 | Jul/11/2013 | Jul/11/2013 |
| <b>Weed Name:</b> | ANGR        | AMBEL       | ABUTH       |
| <b>Density:</b>   | 1           | 2           | <1          |

**Application Equipment**

| Appl | Sprayer | Speed | Nozzle | Nozzle | Nozzle | Nozzle  | Boom  | GPA | Carrier | PSI |
|------|---------|-------|--------|--------|--------|---------|-------|-----|---------|-----|
| A    | Type    | MPH   | Type   | Size   | Height | Spacing | Width |     |         |     |
| A    | Cub     | 3.8   | AIXR   | 11003  | 25"    | 20"     | 100"  | 19  | water   | 35  |

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Trial ID: SOY16-13 Study Dir.: Sprague, Powell  
 Conducted: Campus B-9 Investigator: Christy Sprague

| Weed Code          | ANGR        | AMBEL       | ABUTH       | GLXMA       |
|--------------------|-------------|-------------|-------------|-------------|
| Crop Code          | GLXMA       |             |             | GLXMA       |
| Rating Data Type   | injury      | control     | control     | injury      |
| Rating Unit        | percent     | percent     | percent     | percent     |
| Rating Date        | Jun/26/2013 | Jun/26/2013 | Jun/26/2013 | Jul/03/2013 |
| Trt-Eval Interval  | 7 DA-A      | 7 DA-A      | 7 DA-A      | 14 DA-A     |
| # Subsamples, Dec. | 0           | 0           | 0           | 0           |

| Trt No. | Treatment Name   | Form Conc | Form Type | Rate | Rate Unit   | Grow Stg | Appl Code | GLXMA injury percent | ANGR control percent | AMBEL control percent | ABUTH control percent | GLXMA injury percent |
|---------|------------------|-----------|-----------|------|-------------|----------|-----------|----------------------|----------------------|-----------------------|-----------------------|----------------------|
| 1       | Clethodim        | 2         | EC        | 8    | fl oz/a     | POST     | A         | 0                    | 99                   | 41                    | 60                    | 0                    |
|         | Roundup PowerMax | 4.5       | SL        | 22   | fl oz/a     | POST     | A         |                      |                      |                       |                       |                      |
|         | AMS              |           | WG        | 8.5  | lb/100 gal  | POST     | A         |                      |                      |                       |                       |                      |
|         | WE 1002-3        |           | L         | 1    | qt/100 gal  | POST     | A         |                      |                      |                       |                       |                      |
| 2       | Clethodim        | 2         | EC        | 8    | fl oz/a     | POST     | A         | 0                    | 99                   | 44                    | 60                    | 0                    |
|         | Roundup PowerMax | 4.5       | SL        | 22   | fl oz/a     | POST     | A         |                      |                      |                       |                       |                      |
|         | AMS              |           | WG        | 8.5  | lb/100 gal  | POST     | A         |                      |                      |                       |                       |                      |
|         | WE 1279-2        |           | L         | 1    | qt/100 gal  | POST     | A         |                      |                      |                       |                       |                      |
| 3       | Clethodim        | 2         | EC        | 8    | fl oz/a     | POST     | A         | 0                    | 99                   | 46                    | 50                    | 0                    |
|         | Roundup PowerMax | 4.5       | SL        | 22   | fl oz/a     | POST     | A         |                      |                      |                       |                       |                      |
|         | AMS              |           | WG        | 8.5  | lb/100 gal  | POST     | A         |                      |                      |                       |                       |                      |
|         | WE 1442-1        |           | L         | 7.6  | fl oz/a     | POST     | A         |                      |                      |                       |                       |                      |
| 4       | Clethodim        | 2         | EC        | 8    | fl oz/a     | POST     | A         | 0                    | 99                   | 50                    | 50                    | 0                    |
|         | Roundup PowerMax | 4.5       | SL        | 22   | fl oz/a     | POST     | A         |                      |                      |                       |                       |                      |
|         | AMS              |           | WG        | 8.5  | lb/100 gal  | POST     | A         |                      |                      |                       |                       |                      |
|         | WE 1130-1        |           | L         | 1    | gal/100 gal | POST     | A         |                      |                      |                       |                       |                      |
| 5       | Untreated        |           |           |      |             |          |           | 0                    | 0                    | 0                     | 0                     | 0                    |
| 6       | Flexstar         | 1.88      | L         | 1    | pt/a        | POST     | A         | 15                   | 30                   | 83                    | 86                    | 10                   |
|         | AMS              |           | WG        | 8.5  | lb/100 gal  | POST     | A         |                      |                      |                       |                       |                      |
|         | WE 1258-1        |           | L         | 1    | pt/a        | POST     | A         |                      |                      |                       |                       |                      |
| 7       | Flexstar         | 1.88      | L         | 1    | pt/a        | POST     | A         | 15                   | 34                   | 84                    | 79                    | 10                   |
|         | AMS              |           | WG        | 8.5  | lb/100 gal  | POST     | A         |                      |                      |                       |                       |                      |
|         | WE 1442-1        |           | L         | 40   | fl oz/a     | POST     | A         |                      |                      |                       |                       |                      |
| 8       | Flexstar         | 1.88      | L         | 10   | fl oz/a     | POST     | A         | 13                   | 98                   | 79                    | 78                    | 10                   |
|         | Roundup PowerMax | 4.5       | SL        | 22   | fl oz/a     | POST     | A         |                      |                      |                       |                       |                      |
|         | AMS              |           | WG        | 8.5  | lb/100 gal  | POST     | A         |                      |                      |                       |                       |                      |
|         | WE 1279-2        |           | L         | 1    | qt/100 gal  | POST     | A         |                      |                      |                       |                       |                      |
| 9       | Flexstar         | 1.88      | L         | 10   | fl oz/a     | POST     | A         | 14                   | 66                   | 83                    | 90                    | 10                   |
|         | Roundup PowerMax | 4.5       | SL        | 22   | fl oz/a     | POST     | A         |                      |                      |                       |                       |                      |
|         | AMS              |           | WG        | 8.5  | lb/100 gal  | POST     | A         |                      |                      |                       |                       |                      |
|         | WE 1442-1        |           | L         | 40   | fl oz/a     | POST     | A         |                      |                      |                       |                       |                      |
|         | LSD (P=.05)      |           |           |      |             |          |           | 0.5                  | 13.4                 | 13.2                  | 11.2                  | 0.0                  |
|         | CV               |           |           |      |             |          |           | 5.31                 | 13.07                | 15.91                 | 12.34                 | 0.0                  |

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

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|                    |             |             |             |             |             |
|--------------------|-------------|-------------|-------------|-------------|-------------|
| Weed Code          | ANGR        | AMBEL       | ABUTH       |             | ANGR        |
| Crop Code          |             |             |             | GLXMA       |             |
| Rating Data Type   | control     | control     | control     | injury      | control     |
| Rating Unit        | percent     | percent     | percent     | percent     | percent     |
| Rating Date        | Jul/03/2013 | Jul/03/2013 | Jul/03/2013 | Jul/19/2013 | Jul/19/2013 |
| Trt-Eval Interval  | 14 DA-A     | 14 DA-A     | 14 DA-A     | 30 DA-A     | 30 DA-A     |
| # Subsamples, Dec. | 0           | 0           | 0           | 0           | 0           |

| Trt No.     | Treatment Name   | Form Conc | Form Type | Rate Rate Unit | Grow Stg | Appl Code | ANGR  | AMBEL | ABUTH | GLXMA | ANGR |
|-------------|------------------|-----------|-----------|----------------|----------|-----------|-------|-------|-------|-------|------|
| 1           | Clethodim        | 2         | EC        | 8 fl oz/a      | POST     | A         | 99    | 78    | 68    | 0     | 98   |
|             | Roundup PowerMax | 4.5       | SL        | 22 fl oz/a     | POST     | A         |       |       |       |       |      |
|             | AMS              |           | WG        | 8.5 lb/100 gal | POST     | A         |       |       |       |       |      |
|             | WE 1002-3        |           | L         | 1 qt/100 gal   | POST     | A         |       |       |       |       |      |
| 2           | Clethodim        | 2         | EC        | 8 fl oz/a      | POST     | A         | 99    | 74    | 83    | 0     | 98   |
|             | Roundup PowerMax | 4.5       | SL        | 22 fl oz/a     | POST     | A         |       |       |       |       |      |
|             | AMS              |           | WG        | 8.5 lb/100 gal | POST     | A         |       |       |       |       |      |
|             | WE 1279-2        |           | L         | 1 qt/100 gal   | POST     | A         |       |       |       |       |      |
| 3           | Clethodim        | 2         | EC        | 8 fl oz/a      | POST     | A         | 99    | 75    | 88    | 0     | 98   |
|             | Roundup PowerMax | 4.5       | SL        | 22 fl oz/a     | POST     | A         |       |       |       |       |      |
|             | AMS              |           | WG        | 8.5 lb/100 gal | POST     | A         |       |       |       |       |      |
|             | WE 1442-1        |           | L         | 7.6 fl oz/a    | POST     | A         |       |       |       |       |      |
| 4           | Clethodim        | 2         | EC        | 8 fl oz/a      | POST     | A         | 99    | 69    | 71    | 0     | 97   |
|             | Roundup PowerMax | 4.5       | SL        | 22 fl oz/a     | POST     | A         |       |       |       |       |      |
|             | AMS              |           | WG        | 8.5 lb/100 gal | POST     | A         |       |       |       |       |      |
|             | WE 1130-1        |           | L         | 1 gal/100 gal  | POST     | A         |       |       |       |       |      |
| 5           | Untreated        |           |           |                |          |           | 0     | 0     | 0     | 0     | 0    |
| 6           | Flexstar         | 1.88      | L         | 1 pt/a         | POST     | A         | 45    | 84    | 85    | 0     | 95   |
|             | AMS              |           | WG        | 8.5 lb/100 gal | POST     | A         |       |       |       |       |      |
|             | WE 1258-1        |           | L         | 1 pt/a         | POST     | A         |       |       |       |       |      |
| 7           | Flexstar         | 1.88      | L         | 1 pt/a         | POST     | A         | 62    | 77    | 76    | 0     | 97   |
|             | AMS              |           | WG        | 8.5 lb/100 gal | POST     | A         |       |       |       |       |      |
|             | WE 1442-1        |           | L         | 40 fl oz/a     | POST     | A         |       |       |       |       |      |
| 8           | Flexstar         | 1.88      | L         | 10 fl oz/a     | POST     | A         | 99    | 83    | 83    | 0     | 98   |
|             | Roundup PowerMax | 4.5       | SL        | 22 fl oz/a     | POST     | A         |       |       |       |       |      |
|             | AMS              |           | WG        | 8.5 lb/100 gal | POST     | A         |       |       |       |       |      |
|             | WE 1279-2        |           | L         | 1 qt/100 gal   | POST     | A         |       |       |       |       |      |
| 9           | Flexstar         | 1.88      | L         | 10 fl oz/a     | POST     | A         | 99    | 87    | 84    | 0     | 98   |
|             | Roundup PowerMax | 4.5       | SL        | 22 fl oz/a     | POST     | A         |       |       |       |       |      |
|             | AMS              |           | WG        | 8.5 lb/100 gal | POST     | A         |       |       |       |       |      |
|             | WE 1442-1        |           | L         | 40 fl oz/a     | POST     | A         |       |       |       |       |      |
| LSD (P=.05) |                  |           |           |                |          |           | 17.0  | 7.8   | 15.4  | 0.0   | 1.7  |
| CV          |                  |           |           |                |          |           | 14.83 | 7.71  | 14.58 | 0.0   | 1.34 |

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

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|                    |             |             |
|--------------------|-------------|-------------|
| Weed Code          | AMBEL       | ABUTH       |
| Crop Code          |             |             |
| Rating Data Type   | control     | control     |
| Rating Unit        | percent     | percent     |
| Rating Date        | Jul/19/2013 | Jul/19/2013 |
| Trt-Eval Interval  | 30 DA-A     | 30 DA-A     |
| # Subsamples, Dec. | 0           | 0           |

| Trt No.     | Treatment Name   | Form Conc | Form Type | Rate Rate | Rate Unit   | Grow Stg | Appl Code |      |       |
|-------------|------------------|-----------|-----------|-----------|-------------|----------|-----------|------|-------|
| 1           | Clethodim        | 2         | EC        | 8         | fl oz/a     | POST     | A         | 94   | 94    |
|             | Roundup PowerMax | 4.5       | SL        | 22        | fl oz/a     | POST     | A         |      |       |
|             | AMS              |           | WG        | 8.5       | lb/100 gal  | POST     | A         |      |       |
|             | WE 1002-3        |           | L         | 1         | qt/100 gal  | POST     | A         |      |       |
| 2           | Clethodim        | 2         | EC        | 8         | fl oz/a     | POST     | A         | 93   | 98    |
|             | Roundup PowerMax | 4.5       | SL        | 22        | fl oz/a     | POST     | A         |      |       |
|             | AMS              |           | WG        | 8.5       | lb/100 gal  | POST     | A         |      |       |
|             | WE 1279-2        |           | L         | 1         | qt/100 gal  | POST     | A         |      |       |
| 3           | Clethodim        | 2         | EC        | 8         | fl oz/a     | POST     | A         | 94   | 90    |
|             | Roundup PowerMax | 4.5       | SL        | 22        | fl oz/a     | POST     | A         |      |       |
|             | AMS              |           | WG        | 8.5       | lb/100 gal  | POST     | A         |      |       |
|             | WE 1442-1        |           | L         | 7.6       | fl oz/a     | POST     | A         |      |       |
| 4           | Clethodim        | 2         | EC        | 8         | fl oz/a     | POST     | A         | 93   | 95    |
|             | Roundup PowerMax | 4.5       | SL        | 22        | fl oz/a     | POST     | A         |      |       |
|             | AMS              |           | WG        | 8.5       | lb/100 gal  | POST     | A         |      |       |
|             | WE 1130-1        |           | L         | 1         | gal/100 gal | POST     | A         |      |       |
| 5           | Untreated        |           |           |           |             |          |           | 0    | 0     |
| 6           | Flexstar         | 1.88      | L         | 1         | pt/a        | POST     | A         | 93   | 91    |
|             | AMS              |           | WG        | 8.5       | lb/100 gal  | POST     | A         |      |       |
|             | WE 1258-1        |           | L         | 1         | pt/a        | POST     | A         |      |       |
| 7           | Flexstar         | 1.88      | L         | 1         | pt/a        | POST     | A         | 90   | 77    |
|             | AMS              |           | WG        | 8.5       | lb/100 gal  | POST     | A         |      |       |
|             | WE 1442-1        |           | L         | 40        | fl oz/a     | POST     | A         |      |       |
| 8           | Flexstar         | 1.88      | L         | 10        | fl oz/a     | POST     | A         | 95   | 94    |
|             | Roundup PowerMax | 4.5       | SL        | 22        | fl oz/a     | POST     | A         |      |       |
|             | AMS              |           | WG        | 8.5       | lb/100 gal  | POST     | A         |      |       |
|             | WE 1279-2        |           | L         | 1         | qt/100 gal  | POST     | A         |      |       |
| 9           | Flexstar         | 1.88      | L         | 10        | fl oz/a     | POST     | A         | 92   | 87    |
|             | Roundup PowerMax | 4.5       | SL        | 22        | fl oz/a     | POST     | A         |      |       |
|             | AMS              |           | WG        | 8.5       | lb/100 gal  | POST     | A         |      |       |
|             | WE 1442-1        |           | L         | 40        | fl oz/a     | POST     | A         |      |       |
| LSD (P=.05) |                  |           |           |           |             |          |           | 5.7  | 13.2  |
| CV          |                  |           |           |           |             |          |           | 4.73 | 11.03 |

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