Glyphosate-resistant soybean tolerance to various glyphosate formulations. Urbana, Illinois, 2005. Maxwell, Douglas J., James L. Moody, and Dawn E. Nordby. The objective of this research was to evaluate the response of glyphosate-resistant soybean to various glyphosate formulations. The study was established at the Crop Sciences Research and Education Center, Urbana, IL. The soil was a Drummer silty-clay loam with a pH of 6.4 and 5.3% organic matter. DeKalb 3852 soybean was planted 1.5 inches deep on May 13 in 30 inch rows. Treatments were arranged in randomized complete blocks with four replications of plots 10 by 30 feet. Herbicides were applied with a $CO_2$ backpack sprayer delivering 15 gpa and equipped with 8002 flat fan nozzles. S-metolachlor at 1.91 lb/A and cloransulam at 0.039 lb/A were applied preemergence along with hand weeding to maintain weed-free plots. Application information is listed below:

| | | |
|---|---|---|
| Date | June 29 | July 19 |
| Application | Lpost | VLPost |
| Temperature (F) | | |
| Air | 92 | 87 |
| Soil | 86 | 86 |
| Soil Moisture | dry | moist |
| Wind (mph) | 3-SW | 3-SW |
| Sky Cover (%) | 50 | 0 |
| Precip. after application | | |
| Week 1 (inch) | 0.07 | 1.66 |
| Week 2 (inch) | 1.35 | 0.03 |
| Relative humidity (%) | 50 | 41 |
| | | |
| Soybean | | |
| Leaf no. | R1 | R3 |
| Height (inch) | 16 | 27 |

Minimal crop injury (4% or less) was observed at the 0.75, 1.13, and 1.5 lb acid equivalent (ae)/A rates of all glyphosate formulations applied late postemergence. At 2.25 lbae/A, late postemergence applications of glyphosate as Clearout 41Plus and Roundup Original resulted in up to 11% injury and lowered yields below the check (> 4 bushel difference). The highest rate of glyphosate (3.0 lbae/A) late postemergence caused visual injury from 0-9% with slightly significant reductions in yield for glyphosate treatments as Clearout 41Plus and Touchdown Total. Glyphosate as Weathermax and Roundup Original at 3.0 lbae/A late postemergence caused visual injury from 3-20% along with yield reductions of 8.1 and 9.4 bushels/Acre respectively. At the very-late postemergence timing, glyphosate as Weathermax caused injury from 6-15% and reduced yields by 4.9 and 13.3 bushel/Acre respectively. Incidence of greenstem and delayed maturity of up to 8 days increased with increasing rates and later grow stage applications, with the greatest crop and yield response being with glyphosate as Weathermax and Roundup Original at 3.0 lbae/A late postemergence and very-late postemergence. (Dept. of Crop Sciences, University of Illinois, Urbana).

Table. Glyphosate resistant soybean tolerance to different glyphosate formulations. Urbana, Illinois, 2005. (Maxwell, Moody, and Nordby).

| Treatment | Appl Rate | Time | Glxma 7-6 | Glxma 7-18 | Glxma 7-22 | Glxma 8-11 | Yield 10-12 |
|---|---|---|---|---|---|---|---|
| | (lb-ae/A) | | ----------% inj ---------- | | | | Bu/A |
| Check | - | - | 0 | 0 | 0 | 0 | 69.9 |
| Glyphosate[1] | 0.75 | Lpost | 0 | 0 | 0 | 0 | 66.7 |
| Glyphosate[2] | 0.75 | Lpost | 0 | 1 | 0 | 0 | 68.5 |
| Glyphosate[3] | 0.75 | Lpost | 0 | 1 | 0 | 0 | 71.6 |
| Glyphosate[4]+Activator 90[5] | 0.75+0.5% | Lpost | 0 | 1 | 0 | 0 | 70.5 |
| Glyphosate[1] | 1.13 | Lpost | 0 | 1 | 1 | 0 | 69.0 |
| Glyphosate[2] | 1.13 | Lpost | 0 | 2 | 1 | 0 | 69.0 |
| Glyphosate[3] | 1.13 | Lpost | 0 | 0 | 1 | 0 | 66.7 |
| Glyphosate[4]+Activator 90[5] | 1.13+0.5% | Lpost | 0 | 1 | 1 | 0 | 67.8 |
| Glyphosate[1] | 1.5 | Lpost | 2 | 2 | 1 | 0 | 67.2 |
| Glyphosate[2] | 1.5 | Lpost | 0 | 4 | 3 | 0 | 66.0 |
| Glyphosate[3] | 1.5 | Lpost | 0 | 2 | 2 | 0 | 69.8 |
| Glyphosate[4]+Activator 90[5] | 1.5+0.5% | Lpost | 0 | 4 | 3 | 0 | 67.0 |
| Glyphosate[1] | 2.25 | Lpost | 0 | 3 | 2 | 0 | 66.7 |
| Glyphosate[2] | 2.25 | Lpost | 5 | 6 | 6 | 0 | 67.1 |
| Glyphosate[3] | 2.25 | Lpost | 0 | 5 | 3 | 0 | 65.7 |
| Glyphosate[4]+Activator 90[5] | 2.25+0.5% | Lpost | 3 | 11 | 6 | 1 | 63.7 |
| Glyphosate[1] | 3.0 | Lpost | 3 | 9 | 6 | 0 | 65.0 |
| Glyphosate[2] | 3.0 | Lpost | 13 | 20 | 14 | 2 | 61.8 |
| Glyphosate[3] | 3.0 | Lpost | 5 | 9 | 6 | 1 | 64.8 |
| Glyphosate[4]+Activator 90[5] | 3.0+0.5% | Lpost | 7 | 18 | 16 | 3 | 60.5 |
| Glyphosate[2] | 0.75 | VLpost | 0 | 0 | 2 | 3 | 69.3 |
| Glyphosate[2] | 1.5 | VLpost | 0 | 0 | 6 | 7 | 65.0 |
| Glyphosate[2] | 3.0 | VLpost | 0 | 0 | 11 | 15 | 56.6 |
| LSD (0.05) | | | 2 | 2 | 2 | 1 | 4 |

[1] Touchdown Total; [2] Weathermax; [3] Clearout 41Plus; [4] Roundup Original; [5] Activator 90 is a non-ionic surfactant blend from Loveland Products, Inc.