

Waterhemp control programs in soybean. Krausz, Ronald F. and Bryan G. Young. This study was designed to identify effective programs for consistent control of waterhemp. The study was conducted on a Weir silt loam with 1.9% organic matter and pH 7.1 at the Belleville Research Center. Fertilizer applied was 50 and 150 lb/A P_2O_5 and K_2O , respectively, to an area that had been cropped to soybean in 2001. Asgrow brand 'AG 4602 RR' glyphosate-resistant soybean was planted 1.0 inch deep at 75 lb/A into a reduced-till seedbed on June 4. Plots consisted of four rows with 30 inch row spacing, 25 ft long arranged in a randomized complete block design with 3 replications. The herbicides were broadcast applied with a CO_2 pressurized sprayer using 8003 flat fan tips at 40 PSI in either 10 or 20 GPA water (see table). Application timings were preemergence (PRE), 4 to 6 inch weeds POST only in 10 or 20 GPA (4-6"W-1A and 4-6"W-1B, respectively), 6 to 8 inch weeds (6-8"W), 8 to 10 inch weeds (8-10"W), 10 to 12 inch weeds (10-12"W) and 4 to 6 inch weeds following a PRE application (4-6"W-2). Monthly rainfall in inches was 4.9, 6.6, 1.7, 3.7 and 3.6 in April, May, June, July and August, respectively. Common waterhemp population was 67 per 0.25 m² in the nontreated plots, mid-season.

Application information is listed below.

| Date | Jun-4-02 | Jul-5-02 | Jul-5-02 | Jul-10-02 | Jul-15-02 | Jul-15-02 | Jul-15-02 |
|-----------------------|----------|----------|----------|-----------|-----------|-----------|-----------|
| Treatment | PRE | 4-6"W-1A | 4-6"W-1B | 6-8"W | 8-10"W | 10-12"W | 4-6"W-2 |
| Air temperature (F) | 92 | 96 | 96 | 78 | 88 | 88 | 88 |
| Relative humidity (%) | 52 | 40 | 40 | 94 | 38 | 38 | 38 |
| Soil moisture | normal | dry | dry | dry | dry | dry | dry |
| soybean | | | | | | | |
| leaf no. | | V3 | V3 | V4 | R1 | R1 | R1 |
| height (inch) | | 6 | 6 | 8 | 12 | 12 | 12 |
| common waterhemp | | | | | | | |
| leaf no. | | 4-16 | 4-16 | 8-16 | 8-35 | 10+ | 10-20 |
| height (inch) | | 2-6 | 2-6 | 4-8 | 4-16 | 4-12 | 4-10 |

None of the herbicides caused soybean injury. Sulfentrazone alone controlled 95% of the common waterhemp. Soil herbicides followed by glyphosate or fomesafen controlled 100% of the common waterhemp. Fomesafen alone controlled common waterhemp 58%. Fomesafen plus glyphosate increased common waterhemp control by 24% compared to fomesafen alone. Glyphosate alone controlled common waterhemp 50 to 99%. Glyphosate applied at 6 to 8 inch common waterhemp provided only 50% control whereas glyphosate applied at 8 to 12 inch common waterhemp provided 88 to 94% control. Common waterhemp competition during the entire growing season reduced soybean grain yield by approximately 36%. (Dept. of Plant, Soil and General Agriculture, Southern Illinois University, Carbondale).

Table. Waterhemp control programs in soybean. (Krausz and Young)

| Treatment ^a | Application | | | Soybean yield bu/A | Soybean injury | | | | | | Common waterhemp control | | | | | |
|----------------------------|---------------|----------|--------------------------|--------------------------|----------------------------|-----------|---------------|-----------|---------------|-----------|--------------------------|-----------|---------------|-----------|---------------|-----------|
| | Rate | Time | Spray volume (GPA) | | 14 days after ^b | | 28 days after | | 56 days after | | 14 days after | | 28 days after | | 56 days after | |
| | | | | | App1 % | App2 % | App1 % | App2 % | App1 % | App2 % | App1 % | App2 % | App1 % | App2 % | App1 % | App2 % |
| Nontreated | | | | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Glyphosate | 0.75 | 4-6"W-1A | 10 | 46 | 0 | 0 | 0 | 0 | 0 | 0 | 85 | 85 | 83 | 83 | 83 | 83 |
| Glyphosate | 0.75 | 6-8"W | 10 | 43 | 0 | 0 | 0 | 0 | 0 | 0 | 58 | 58 | 50 | 50 | 50 | 50 |
| Sulfentrazone | 0.25 | PRE | 20 | 47 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | 98 | 98 | 95 | 95 |
| Sulfentrazone | 0.25 | PRE | 20 | 46 | 0 | 0 | 0 | 0 | | 0 | 100 | 100 | 98 | 100 | | 100 |
| /glyphosate | /0.75 | /4-6"W-2 | | | | | | | | | | | | | | |
| S-metolachlor&CGA-154281 | 1.43 | PRE | 20 | 51 | 0 | 0 | 0 | 0 | | 0 | 100 | 100 | 100 | 100 | | 100 |
| +sulfentrazone | +0.188 | | | | | | | | | | | | | | | |
| /glyphosate | /0.75 | /4-6"W-2 | | | | | | | | | | | | | | |
| S-metolachlor&CGA-154281 | 1.43 | PRE | 20 | 52 | 0 | 0 | 0 | 0 | | 0 | 100 | 100 | 100 | 100 | | 100 |
| +chlorimuron&sulfentrazone | +0.0352&0.176 | | | | | | | | | | | | | | | |
| /glyphosate | /0.75 | /4-6"W-2 | | | | | | | | | | | | | | |
| S-metolachlor&metribuzin | 1.0&0.234 | PRE | 20 | 47 | 0 | 0 | 0 | 0 | | 0 | 100 | 100 | 99 | 100 | | 100 |
| /glyphosate | /0.75 | /4-6"W-2 | | | | | | | | | | | | | | |
| S-metolachlor&metribuzin | 1.18&0.28 | PRE | 20 | 50 | 0 | 0 | 0 | 0 | | 0 | 100 | 100 | 100 | 100 | | 100 |
| /glyphosate | /0.75 | /4-6"W-2 | | | | | | | | | | | | | | |
| S-metolachlor&metribuzin | 1.0&0.234 | PRE | 20 | 50 | 0 | 0 | 0 | 0 | | 0 | 100 | 100 | 98 | 100 | | 100 |
| /fomesafen+fluazifop-P | /0.294+0.156 | /4-6"W-2 | | | | | | | | | | | | | | |
| &fenoxaprop+COC+28%N | &0.052 | | | | | | | | | | | | | | | |
| Fomesafen+COC+28%N | 0.294 | 4-6"W-1B | 20 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 58 | 58 | 58 | 58 | 58 | 58 |
| Fomesafen+glyphosate | 0.176+0.75 | 4-6"W-1A | 10 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 85 | 85 | 82 | 82 | 82 | 82 |
| Glyphosate | 0.75 | 4-6"W-1A | 10 | 48 | 0 | 0 | 0 | 0 | 0 | 0 | 90 | 90 | 99 | 99 | 99 | 99 |
| /glyphosate | /0.75 | /2-4"RG | | | | | | | | | | | | | | |
| Glyphosate | 0.75 | 8-10"W | 10 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 83 | 83 | 93 | 93 | 98 | 98 |
| Glyphosate | 0.75 | 10-12"W | 10 | 46 | 0 | 0 | 0 | 0 | 0 | 0 | 82 | 82 | 88 | 88 | 98 | 98 |
| Glyphosate | 1.13 | 10-12"W | 10 | 41 | 0 | 0 | 0 | 0 | 0 | 0 | 90 | 90 | 94 | 94 | 95 | 95 |
| LSD | | | | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 8 | 8 | 8 | 7 |
| P | | | | 0.01 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |

^aAll glyphosate applications, except when tank-mixed with fomesafen, included AMS at 2.0% w/w. AMS = spray grade ammonium sulfate.

All COC at 1.0% v/v. COC = Prime Oil crop oil concentrate, a petroleum based additive with 17% emulsifier from Agrilience.

All 28%N at 4.0 pt/A. 28%N = 28% urea ammonium nitrate.

^bRating timings and dates:

Days after App1 = days after the PRE application for PRE only or PRE/POST treatments or days after POST for POST only treatments or days after first for POST/POST treatments.

Days after App2 = days after POST for PRE/POST treatments or days after POST for POST only treatments or days after second POST for POST/POST treatments.

Ratings at 14 days after PRE, 4-6"W-1A, 4-6"W-1B, 6-8"W, and 8-10"W, or 10-12"W, or 4-6"W-2 applications were on 6-18-02, 7-19-02, 7-19-02, 7-24-02, and 7-29-02, respectively.

Ratings at 28 days after PRE, 4-6"W-1A, 4-6"W-1B, 6-8"W, and 8-10"W, or 10-12"W, or 4-6"W-2 applications were on 7-2-02, 8-2-02, 8-2-02, 8-7-02, and 8-12-02, respectively.

Ratings at 56 days after PRE, 4-6"W-1A, 4-6"W-1B, 6-8"W, and 8-10"W, or 10-12"W, or 4-6"W-2 applications were on 7-30-02, 8-30-02, 8-30-02, 9-4-02, and 9-9-02, respectively.