

Effect of nitrogen on common waterhemp control in soybean. Krausz, Ronald F. and Bryan G.

Young. This study was designed to evaluate the effect of nitrogen on common waterhemp control in soybean. The study was conducted on a Weir silt loam with 1.7% organic matter and pH 6.8 at the Belleville Research Center. Fertilizer applied was 50 and 200 lb/A P_2O_5 and K_2O , respectively, to an area that had been cropped to corn 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 3. Nitrogen applications were hand spread at 0 or 120 lb N/A (see table) on June 4. Plots consisted of four rows with 30 inch row spacing, 27ft long arranged in a randomized complete block design with 3 replications. The herbicides were broadcast applied with a CO_2 pressurized sprayer using 8002 flat fan tips at 40 PSI in 20 GPA water. Application timings were preemergence herbicide (PRE-1), preemergence fertilizer (PRE-2), 3 inch grass POST only (3"GR-1), 3 inch grass PRE/POST (3"GR-2), 6 inch waterhemp (6"WH) and 14 days after 6 inch waterhemp application (14DA6"WH). Clethodim was applied across the entire area to control grass. Monthly rainfall in inches was 4.9, 6.6, 1.7, 3.7 and 3.6 in April, May, June, July and August, respectively. The study was weed-free with the exception of common waterhemp which was present at 213 to 230 plants per m^2 in the nontreated plots at mid-season.

Application information is listed below.

| | | | | | | |
|------------------|----------|----------|-----------|-----------|----------|-----------|
| Date | Jun-4-02 | Jun-4-02 | Jun-19-02 | Jun-19-02 | Jul-1-02 | Jul-15-02 |
| Treatment | PRE-1 | PRE-2 | 3"GR-1 | 3"GR-2 | 6"WH | 14DA6"WH |
| Soil moisture | normal | normal | normal | normal | dry | dry |
| soybean | | | | | | |
| leaf no. | | | V1 | V1 | V3 | V8-R1 |
| height (inch) | | | 3-4 | 3-4 | 5-7 | 12 |
| common waterhemp | | | | | | |
| leaf no. | | | | | 8-10 | 6-15 |
| height (inch) | | | | | 4-6 | 3-10 |

Nitrogen had an effect on common waterhemp control where no soil herbicide or no glyphosate was applied. Common waterhemp control decreased as nitrogen rate was increased from 0 to 120 lb/A. Nitrogen also affected common waterhemp height with a 42% reduction in common waterhemp height 28 and 56 DAT where no nitrogen was applied. The greatest common waterhemp population was observed where nitrogen at 120 lb/A was applied. There was no difference in fresh weight of common waterhemp due to nitrogen. Common waterhemp competition did not reduce soybean height. Common waterhemp competition reduced grain yield by 42% where no nitrogen was applied. However, common waterhemp competition reduced grain yield by 69% where nitrogen at 120 lb/A was applied. Nitrogen did not increase soybean height or grain yield. Nitrogen had no effect on common waterhemp control where sulfentrazone or glyphosate were applied with control ranging from 97 to 100%. (Dept. of Plant, Soil and General Agriculture, Southern Illinois University, Carbondale).

Table. Effect of nitrogen on common waterhemp control in soybean. (Krausz and Young)

| Treatment ^a | Application | | Soybean yield bu/A | Soybean injury | | | Soybean height Oct-9 inch | Common waterhemp | | | | | | | |
|---|-----------------------------|------------------------------------|--------------------------|--------------------------------------|-----|-----|------------------------------------|------------------------------------|------|--|------|------------------------|--------------------|----------------------|----------------------|
| | | | | days after treatment ^b | | | | Control days after treatment | | Height reduction ^c days after treatment | | 56 days after planting | | | |
| | | | | | | | | | | | | Plants | Fresh weight | Dry weight | |
| | Rate | Time | | 14 | 28 | 56 | | 14 | 28 | 56 | 28 | 56 | 1.0 m ² | g/1.0 m ² | g/1.0 m ² |
| | (lb/A) | | % | % | % | % | % | % | % | % | % | | | | |
| No nitrogen fertilizer clethodim+COC | 0.125 | 3"GR-1 | 31 | 0 | 0 | 0 | 39 | 50 | 17 | 17 | 42 | 42 | 213 | 1769 | 212 |
| Fertilizer 34-0-0 /clethodim+COC | 120 /0.125 | PRE-2 /3"GR-1 | 15 | 0 | 0 | 0 | 39 | 0 | 0 | 0 | 0 | 0 | 230 | 2800 | 336 |
| No nitrogen fertilizer clethodim+COC +handweed after post | 0.125 | 3"GR-1 | 53 | 0 | 0 | 0 | 41 | 100 | 100 | 100 | 100 | 100 | | | |
| Fertilizer 34-0-0 /clethodim+COC +handweed after post | 120 /0.125 | PRE-2 /3"GR-1 | 49 | 0 | 0 | 0 | 42 | 100 | 100 | 100 | 100 | 100 | | | |
| Sulfentrazone no nitrogen fertilizer /clethodim+COC | 0.25 /0.125 | PRE-1 /3"GR-2 | 46 | 0 | 0 | 0 | 42 | 100 | 99 | 97 | 58 | 33 | | | |
| Sulfentrazone /fertilizer 34-0-0 /clethodim+COC | 0.25 /120 /0.125 | PRE-1 /PRE-2 /3"GR-2 | 43 | 0 | 0 | 0 | 42 | 98 | 96 | 97 | 20 | 17 | | | |
| No nitrogen fertilizer clethodim+COC /glyphosate | 0.125 /0.75 | 3"GR-1 /6"WH | 54 | 0 | 0 | 0 | 41 | 90 | 97 | 100 | 90 | 100 | | | |
| Fertilizer 34-0-0 /clethodim+COC /glyphosate | 120 /0.125 /0.75 | PRE-2 /3"GR-1 /6"WH | 50 | 0 | 0 | 0 | 41 | 90 | 97 | 100 | 90 | 100 | | | |
| No nitrogen fertilizer clethodim+COC /glyphosate/glyphosate | 0.125 /0.75/0.75 | 3"GR-1 /6"WH/14DA6"WH | 48 | 0 | 0 | 0 | 41 | 90 | 96 | 100 | 90 | 100 | | | |
| Fertilizer 34-0-0 /clethodim+COC /glyphosate/glyphosate | 120 /0.125 /0.75/0.75 | PRE-2 /3"GR-1 /6"WH/14DA6"WH | 51 | 0 | 0 | 0 | 41 | 92 | 95 | 100 | 90 | 100 | | | |
| LSD | | | 6 | 0 | 0 | 0 | 2 | 2 | 16 | 16 | 26 | 18 | 8 | 1517 | 186 |
| P | | | 0.01 | 1.0 | 1.0 | 1.0 | 0.06 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.10 | 0.1 |

^aAll COC at 1.0% v/v. COC = Prime Oil crop oil concentrate, a petroleum based additive with 17% emulsifier from Agrilience.^bRating dates:

Ratings at 14, 28, and 56 days after the PRE application were on 6-18-02, 7-2-02, and 7-30-02, respectively.

Ratings at 14, 28, and 56 days after the 6"WH application were on 7-15-02, 7-29-02, and 8-26-02, respectively.

Ratings at 14, 28, and 56 days after the 6"WH application were also 0, 14, and 42 days after the 14DA6"WH application, respectively.

^cCommon waterhemp height reduction due to lack of nitrogen or herbicide treatment.