

GLUFOSINATE-RESISTANT COTTON RESPONSE TO REDUCED RATES OF GLYPHOSATE

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Abstract

Research was conducted in 2003 at the Northeast Research Station in St. Joseph, La, to evaluate glufosinate-resistant cotton response to reduced rates of Roundup Weathermax (glyphosate) that may be encountered in drift or sprayer contamination events. Roundup Weathermax rates of 0.15, 0.2, 0.25, 0.3, 0.35, 0.4, 0.45, 0.5, 0.55, or 0.6 lb ai/A, representing 15, 20, 25, 30, 35, 40, 45, 50, 55, or 60% of a 1.0 lb ai/A (22 oz/A) use rate, were applied to Fibermax LL 981 cotton at the 3 or 6 leaf growth stage. A nontreated control was included for comparison. Applications were made using a CO₂ backpack sprayer at 15 GPA to each 2 row 6.67' x 35' plot. Parameters measured included plant height 30 days after application (DAT) and prior to harvest, percent first harvest, and seedcotton yield. The nontreated control was used to calculate percent reduction values for all parameters measured except percent first harvest, but was not included in the statistical analysis.

At the 3-leaf application timing, height reduction 30 DAT ranged from 36 to 71% and was maximized at the 0.3 lb ai/A rate (61%). At the 6-leaf timing, reduction ranged from 14 to 46% and was maximized at the 0.35 lb ai/A rate (37%). At rates of 0.2 lb ai/A or higher, height reduction following Roundup Weathermax application was greater at the earlier timing (43 to 72% vs. 14 to 46%). Height prior to harvest ranged from a decrease of 22% to an increase of 18%, with few differences noted among Roundup Weathermax rates and application timing. Percent first harvest for the 3 and 6 leaf application timing ranged from 71 to 88% and 77 to 93%, respectively, with few differences noted among Roundup Weathermax rates and no differences noted between application timings. Yield reduction data was extremely variable. At the 3-leaf timing, yield ranged from an increase of 47% to a reduction of 73%. Yield reduction was maximized at the 0.25 lb ai/A rate (32%). At the later application timing, yield ranged from an increase of 2% to a decrease of 45% with no differences noted among Roundup Weathermax rates. Of interest was that at the two lowest rates, significant yield reduction occurred at the later 6-leaf application compared to yield increases at the earlier timing.

In conclusion, yield impact on glufosinate-resistant cotton following Roundup Weathermax application can be quite variable, ranging from an actual increase in yield at lower rates when applied to 3 leaf cotton to greater than a 20% reduction at higher rates. Glufosinate-resistant cotton appeared to be more sensitive, based on yield reduction, at lower rates (<0.25 lb ai/A) when application occurred at the 6 leaf timing compared to the 3 leaf timing while differences among growth stages was less prevalent or nonexistent at higher rates. As acceptance of both transgenic technologies and likelihood of adjacent production fields increases, all precautions must be taken to eliminate misapplication of Roundup Weathermax on glufosinate-resistant cotton through spray drift or sprayer contamination, or deleterious effects may result.