

**YIELD AND FRUITING BEHAVIOR OF ROUNDUP READY® FLEX COTTON
(GOSSYPIUM HIRSUTUM L.) IN TEN ENVIRONMENTS IN 2001**

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Abstract

Glyphosate [*N*-(phosphonomethyl)-glycine] herbicide can be topically applied twice at rates up to 0.84 kg a.e. ha⁻¹ to glyphosate-resistant (Roundup Ready) cotton cultivars from emergence through the fourth true leaf development stage, allowing at least 10 days and two nodes of growth between applications. But, such cultivars are often not reproductively resistant to topical or imprecisely directed glyphosate applications after the four-leaf stage because glyphosate can curtail pollen development and ovule fertilization, potentially reducing yield. Expanding the use pattern or rate of glyphosate in Roundup Ready cotton by enhancing glyphosate-resistance would add flexibility for weed management. Our objective was to test under field conditions glyphosate resistance of cotton germplasm transformed by Monsanto with a new gene construct imparting expanded glyphosate resistance in the greenhouse. Four to six Monsanto transgenic cotton lines containing the same construct conferring expanded glyphosate resistance, plus the current glyphosate-resistance positive control ('Coker 312'-1445), were tested at 10 U.S. locations in 2001. Within locations, treatment designs consisted of various cross-classified arrangements of transgenic germplasm lines and glyphosate rates. Glyphosate at 0, 1.68, and 2.52 kg a.e. ha⁻¹ was applied sequentially over-the-top of cotton at the 3-, 6-, 10-, and 14-leaf crop stages. The 1.68 and 2.52 kg a.e. ha⁻¹ glyphosate rates correspond to 2X and 3X maximum labeled rates, respectively, for application to current glyphosate-resistant cotton. Compared with Coker 312-1445, expanded glyphosate resistance was expressed as higher yields when glyphosate was sequentially applied topically at the four growth stages and at either the 1.68 or 2.52 kg a.e. ha⁻¹ rate. Plant mapping at crop maturity confirmed expanded glyphosate resistance imparted by the new gene construct as similar fruit distribution and weight when treated or not with glyphosate. The capability to apply glyphosate to cotton later in crop development and at higher rates will facilitate and en-

hance weed management practices. Commercialization of the expanded glyphosate-resistance technology (tradenname Roundup Ready[®] Flex) is not envisioned until 2006 or later, but soon thereafter should provide growers with more weed management options.