

**TWO YEARS OF EXPERIENCE WITH MONSANTO'S
ENHANCED GLYPHOSATE TOLERANT COTTON**

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Abstract

Current glyphosate [*N*-(phosphonomethyl)-glycine] herbicide tolerant (Roundup Ready[®]) cotton cultivars tolerate over-the-top glyphosate applications at or before the four leaf growth stage. Cotton is less reproductively tolerant of topical or post-directed glyphosate applications with plant contact past the four-leaf stage because glyphosate can interfere with pollen development, sometimes causing yield loss. Extending glyphosate tolerance later in crop development would enhance flexibility in using this popular, environmentally benign, broad-spectrum herbicide for weed management. Our objective was to test transgenic cotton germplasm lines putatively expressing enhanced glyphosate tolerance under field conditions at Tifton, GA. Six Monsanto transgenic cotton lines plus the current glyphosate tolerance technology control (transformation event Coker 312-1445), were tested in 2000, while five additional lines, plus one tested in 2000, and Coker 312-1445 were tested in 2001. Strip-plot treatment designs with a factorial arrangement of germplasm line and glyphosate rate were employed both years. Glyphosate at rates 0, 1.25, and 1.68 kg ae/ha was applied sequentially over-the-top of cotton at the four- and eight-leaf crop stages in 2000, while in 2001 a more rigorous regime involving sequential over-the-top applications at rates 0, 1.68, and 2.52 kg ae/ha made at the 3-, 6-, 10-, and 14-leaf stages was employed. At 100% open boll maturity, we box mapped 3-m of each plot. We then sampled 25 bolls from all plots to determine lint fraction, followed by machine harvest for seed-cotton yield determination. Plot seed-cotton yields were the sum of the machine picked yield and the hand picked yields from the box-map. Compared with the current cotton Roundup Ready technology reference standard Coker 312-1445, enhanced glyphosate tolerance is expressed as higher yields when glyphosate is applied past the four-leaf stage. Fruit distribution from the box-map confirmed enhanced glyphosate tolerance through ability to set and mature fruit at lower fruiting sites with or without glyphosate applications. Transgenic cotton with extended reproductive tolerance to glyphosate will facilitate cotton weed-management and should reduce production costs.