

**RESPONSE OF ROUNDUP READY COTTON
TO ROUNDUP ULTRA**

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Transgenic cotton cultivars expressing herbicide tolerance to topical applications of herbicides are commercially available. It has been documented that under certain conditions, applications of Roundup Ultra® (glyphosate) to Roundup Ready® (RR) cotton can lead to fruit shed and possible yield reductions. To assess these problems with RR cotton, growth chamber and field studies were conducted at the Texas A&M Agricultural Experiment Station using glyphosate-tolerant cotton, cv. 'DPL 5690RR'.

For the laboratory study, glyphosate treatments consisted of 0, 0.56, 1.12, and 2.24 a.i. kg ha⁻¹ sprayed with a hand-boom to all exposed foliage at the 11- to 13-leaf stage. Immediately following this application, ¹⁴C-glyphosate was applied using a microsyringe to the three uppermost fully expanded leaves at 0, 37, 74, and 148 kBq per leaf for the 0, 0.56, 1.12, and 2.24 a.i. kg ha⁻¹ treatments, respectively. As rates of topically applied glyphosate increased, the amount of glyphosate translocated to bolls increased, with the 2.24 a.i. kg ha⁻¹ rate causing more abscission than all other rates. The critical concentration promoting boll abscission was estimated between 37.0 and 126.4 mg g⁻¹ of dried boll, which was achieved only with a non-labeled rate of 2.24 a.i. kg ha⁻¹. Fruit number was reduced throughout the plant rather than only on the lower portion of the plant. These data suggest that translocated glyphosate to the bolls was the cause for boll abscission because of the strong relationship between the concentration of glyphosate found in abscised bolls and fruit abscission levels ($r^2=0.99$).

Field studies were conducted to determine if application time and method affected fruit retention. Treatments consisted of applying 1.12 a.i. kg ha⁻¹ either postdirected, non-labeled postdirected (25% foliage coverage), or topical at the 8th- or 18th-leaf stage after an initial topical application at the 4th-leaf stage. Both non-labeled postdirected and topical applications of glyphosate caused yield loss. Glyphosate appeared to affect the cotton plant below and above the application zone suggesting both basipetal and acropetal translocation. Producers may need to prevent glyphosate contact with both cotton stems and leaves when applying glyphosate after the 4th leaf stage to prevent possible yield losses.