

**ROUNDUP (GLYPHOSATE) BEHAVIOR
IN ROUNDUP-READY (GLYPHOSATE-
TOLERANT) COTTON**

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These data suggest that applications of Roundup to 12 leaf and 2 weeks after first bloom stage cotton, regardless of application method, result in greater Roundup absorption and translocation than applications made to smaller cotton. Roundup absorption and translocation to reproductive tissues could offer some explanation of symptoms observed in field situations.

Abstract

Although there has been wide acceptance of Roundup-Ready cotton by growers, there have been complaints in states in the Southeastern USA of increased boll abortion, "cavitation," and misshapen bolls. Studies were conducted using ^{14}C -Roundup to determine whether application method [postemergence over-the-top (POST) vs. post-directed (PDS)] or cotton growth stage at application affect herbicide absorption, and also to determine in which tissues Roundup accumulates after each of these applications. Studies were conducted in a plastic greenhouse using DeltaPine 5415 RR cotton plants. The experimental design was a three level factorial with the following levels: application position (POST or PDS), growth stage at application [4 leaf, 8 leaf, 12 leaf, and 2 weeks after first bloom (2 WAFB)], and harvest interval (3 and 7 days after treatment). The study had 4 replications and was repeated. Each plant was treated with 10 μL of solution containing 0.1 μCi ^{14}C -Roundup on the newest fully expanded leaf (POST applications) or on a 5-cm section of stem at the base of the plant (PDS applications). At harvest, treated parts were washed with a solution of 1:1 methanol: water + 0.25% non-ionic surfactant to recover non-absorbed ^{14}C -Roundup. Plants were then sectioned into treated stem or leaf, roots, mature leaves, immature leaves and buds, stems, fruiting branches, squares, and bolls. Dry weights were taken and each plant part was oxidized to recover absorbed ^{14}C -Roundup. ^{14}C -Roundup absorption at 3 and 7 days after treatment was greatest at the 12 leaf growth stage and lowest at the 4 leaf stage. At 3 days after treatment, ^{14}C -Roundup absorption was greater in PDS treatments than in POST treatments, however, absorption at 7 days after treatment did not differ by application method. Translocation out of the treated part was greater at the 12 leaf and 2 WAFB growth stages than at 4 and 8 leaf stages indicating greater Roundup mobility when applied to larger plants. ^{14}C -Roundup translocation to roots was higher with PDS treatments than POST treatments at all growth stages. Also, translocation to squares at the 2 weeks after first bloom stage was greater in post-directed applications than in post applications. Significant ^{14}C -Roundup accumulation was observed in mature leaves, immature leaves & buds, and roots at the 4 and 8 leaf growth stage, and in all tissues except bolls at the 12 leaf and 2 weeks after first bloom growth stages.