

**EVALUATION OF DIFFERENT RATES AND TIMING OF GLYPHOSATE
OVER-THE-TOP APPLICATION ON ROUNDUP READY™ COTTON**

Ramon F. Mery, J. Tom Cothren, and Ty K. Witten

Texas Agricultural Experiment Station

Texas A&M University

College Station, TX

Byron L. Burson

USDA-ARS

College Station, TX

Abstract

Although Roundup Ready™ technology provides cotton growers with weed control advantages, previous studies have shown that over-the-top applications of Roundup™ (glyphosate) can potentially reduce Roundup Ready cotton lint yield. Therefore, the objectives of this project were to determine the effects of over-the-top applications of glyphosate on Roundup Ready cotton yield, pollination efficiency, and boll distribution. A two-year study was conducted at the Texas Agricultural Experiment Station, near College Station, TX. Deltapine 5690 RR was planted and maintained using conventional irrigation and insect management practices. Treatments consisted of Roundup Ultra™ applied at three different rates; 0.5, 1, and 2 qt/A, at three different stages of growth (4-, 8-, and 12-leaf). Rates were designed to bracket the labeled recommendation of a single over-the-top application of 1 qt/A until the 4-leaf stage. In both years, as the rate of glyphosate increased and the leaf stage of application was delayed, lint yield was reduced. In the first year, lint yield reduction was significant only for all rates within the 12-leaf stage treatments. However, significant differences were noted in the second year for the 2qt/A rate at the 4-leaf stage, and for all rates within the 8- and 12-leaf stage treatments. Twelve hours after natural pollination, the degree of anther opening, and the number of pollen grains attached to the stigma were determined for first position flowers. In both years, as the rate of glyphosate increased and the stage of application was delayed, a greater number of anthers remained closed and fewer pollen grains were attached to the stigma. Fruiting patterns as determined by boxmapping data showed that, as the rate of glyphosate increased and the stage of application was delayed, fewer first position bolls were retained. Under these conditions, plants tried to compensate for yield losses by setting bolls at more distal positions. Lower pollen availability may have contributed to the lower first position boll retention. Additionally, the more distal position fruit tended to be smaller in size and weight. The closer the glyphosate application was to floral development, the greater the effect upon pollen availability, as determined by pollen count data. Glyphosate applied according to the label recommendation had no detrimental effects on lint yield even though it did affect pollen availability. Thus, remaining pollen grains were sufficient to achieve successful pollination on first position flowers.