INFLUENCE OF GLUFOSINATE TIMING ON COTTON GROWTH AND YIELD

Kelly A. Barnett Lawrence E. Steckel University of Tennessee Jackson, TN Alan C. York North Carolina State University Raleigh, NC A. Stanley Culpepper University of Georgia Tifton, GA.

<u>Abstract</u>

Glyphosate-resistant (GR) weeds are a major issue for Georgia, North Carolina and Tennessee cotton growers. These GR weeds can be problematic to control when relying only on timely rains to activate pre applied herbicides. GR horseweed, GR giant ragweed, and GR Palmer amaranth are the three GR weeds that can currently be found in Tennessee. GR Palmer amaranth has become the most difficult to control of these. Fortunately, a timely Ignite application can control all three of these weeds. As a result, many growers have moved to an Ignite-based system to manage GR weeds, which includes a pre applied herbicide followed by at least one over-the-top Ignite application. Liberty Link cotton varieties are planted on just a few acres in Tennessee due to inconsistent performance of these varieties in the state. Over 60% of the cotton acres in Tennessee are planted to a WideStrike cotton variety which has tolerance to both glyphosate and glufosinate (Ignite). The WideStrike cotton varieties have moderate tolerance to Ignite. The injury range is typically in the 5 to 25% range. However, this is for one application and growers are often using multiple applications throughout the growing season in order to control GR Palmer. Growers often call asking how much injury one can encounter from repeated Ignite applications to WideStrike varieties. Therefore a study was constructed that examined glufosinate applied one, two, or three times throughout the growing season at a rate of 29 oz/A. Treatments were applied to cotton at the 2-leaf, 7-leaf, bloom, or two weeks after blooming stage. Plots were maintained weed-free throughout the growing season. The objective of this study was to determine if one or more glufosinate applications at different timings affected cotton growth, development, and yield. The experiment was arranged as a factorial design to examine the effect of timing and number of glufosinate applications on crop injury and yield. Location was not significant; therefore data were combined across locations. Treatment was significant at p<.05. Therefore, differences between the number of applications were analyzed by constructing single degree of freedom contrast statements. Crop height was not significant after any application timing, however crop injury and yield were significant at p < .05. Three applications of glufosinate resulted in increased visual crop injury when compared with cotton that received two or less glufosinate applications. Observed injury ratings at bloom or after bloom ranged from 7-13% (3 glufosinate applications), 4-6% (2 glufosinate applications), and 2-4% (1 glufosinate application), with no visible crop injury for the non-treated check. Three weeks after the last application, no visible crop injury was observed for any treatment. However, the number of glufosinate applications also significantly impacted crop yield. Three applications of glufosinate resulted in 1181 lb/A of lint cotton, which was significantly lower when compared with two (1280 lb/A) or one (1321 lb/A) applications of glufosinate. The non-treated check had a lint cotton yield of 1327 lb/A. Results indicate that one to two applications of glufosinate to WideStrike cotton will not negatively impact yields; however, three applications of glufosinate throughout the growing season may increase crop injury and ultimately decrease crop yield.