FACTORS CONTRIBUTING TO COTTON INJURY FROM SOIL-APPLIED HERBICIDES D.B. Johnson J.K. Norsworthy B.W. Schrage H.D. Bell Z.T. Hill University of Arkansas Division of Agriculture Fayetteville, AR

<u>Abstract</u>

With the evolution of glyphosate-resistant weeds throughout the Midsouth, especially Palmer amaranth, many cotton growers are reverting to using soil-applied herbicides as part of an integrated weed management approach to controlling these weeds. Preemergence (PRE) herbicides, although often effective, can cause considerable injury to cotton; hence some growers are reluctant to use these products. Agronomic and environmental factors that could potentially affect the tolerance of cotton to PRE-applied herbicides were evaluated to better understand the causes of injury and steps growers could take to minimize the risk of injury from soil-applied herbicides. Field experiments were conducted in the summer of 2012 to evaluate the influence of cotton seed size, planting depth, and seed vigor on cotton tolerance various rates of PRE-applied herbicides. The first experiment was conducted in Fayetteville, AR at the Arkansas Agricultural Research and Extension Center on a Taloka silt loam soil. The experiment was conducted in a randomized complete block design with a factorial arrangement of five seed sizes by two rates (1X and 2X) of diuron with four replications. Cotton seed sizes ranged from 9.3 to 13.1 g/100 seed count (ct). The second experiment was conducted at the Southeast Research and Extension Center in Rohwer, AR on a Hebert silt loam soil. The experiment was organized in a split-split plot design with the main plot being planting depth (1.27 and 2.54 cm), the subplot being herbicide product (diuron, fomesafen, and fluometuron) at two application rates (1X and 2X), and seedling vigor (low and high) as the sub-sub plot factor, replicated four times. Both experiments were assessed for injury, plants per 2 m⁻¹ of row, and biomass. Smaller seed, generally less than 11.6 g/100 ct, exhibited more injury and less biomass than that of the larger seed. Depth of seed had no significant effect on injury from fluometuron; however, injury increased in cotton when planted at 2.54 cm whereas, injury decreased in cotton planted at 2.54 cm from diuron. High seed vigor resulted in less injury from diuron, fomesofan and fluometuron.