2002 BELTWIDE COTTON CONFERENCES, ATLANTA, GA – JANUARY 8-12

GLYPHOSATE EFFECTS ON REPRODUCTIVE DEVELOPMENT

R.P. Viator, W. Pline, R. Wells, K. Edmisten,
J. Wilcut and J.T. Cothren
Department of Crop Science
North Carolina State University
Raleigh, NC

Abstract

Previous research has indicated glyphosate accumulation in reproductive structures of glyphosate-resistant cotton grown under greenhouse and growth chamber conditions. It has been estimated that cotton fruit can withstand 7 to 16.6 µg/g dried tissue of glyphosate before abscission occurs. The objective of this research was to validate this threshold under field conditions. The maximum level of glyphosate accumulation was 0.63 to 3.2 µg/g under field conditions, which is lower than 7 to 16.6 µg/g found under growth chamber conditions. This may be due to additional plant stress under field conditions lowering the glyphosate threshold for retention. ^{14}C-glyphosate was found in bracts, lint, and seed. After determining the levels of ^{14}C-glyphosate within cotton seed, another study was conducted to determine the expression of the alternative EPSPS enzyme in developing seed and to investigate if glyphosate accumulation within bolls affects seed quality. Levels of the enzyme were higher in young seed than in leaf, anther, boll, and mature seed samples. As far as seed quality, glyphosate did not affect seed density, Texas cool germination, hot germination, seedling growth rates, percent oil, or fatty acid composition.