

**THE SPECTRAL RESPONSE OF COTTON TO DRIFT RATES OF 2,4-D AND ITS EFFECT ON GROWTH AND YIELD****Chad L. Smith****Daniel B. Reynolds****J. Trenton Irby****L. M. Bruce****Reed C. Storey****Amber N. Eytheson****Mississippi State University****Mississippi State, MS****Abstract**

Recent advancements in herbicide-resistant traits are trending toward crops resistant to growth-regulator herbicides such as 2,4-D and dicamba. Non-transgenic cotton is extremely susceptible to injury from 2,4-D and often results from drift from surrounding fields. The goal of this study was to evaluate simulated 2,4-D drift injury on cotton while examining the resulting injury, aerial spectral imagery and resultant yield. Studies were conducted in 2009 in Brooksville, MS and in 2010 and 2011 near both Starkville, MS and Brooksville, MS. The factorial experimental design had a main factor of application timing and as sub factor of the 2,4-D rate. The application timing was either made on “younger cotton” ranging from 4 to 10 nodes maturity or “older cotton” ranging from 10 to 16 nodes in maturity. Within each application timing a 1X rate of 2,4-D @ 16 fl oz/A (0.475 lb ae/A) was made as well as treatments including fractions of that rate. Treatments included a 1/4 X rate @ 4 fl oz/A, a 1/16 X rate @ 1 fl oz/A, a 1/64 X rate at 0.25 fl oz/A and a 1/256 X rate @ 0.0625 fl oz/A. Data were subjected to ANOVA, separated by Fishers Protected LSD at  $\alpha=0.05$  and were pooled across timings and locations when possible.

Visual Injury occurring on young cotton during the 1st WAA (Week After Application) was not different from injury on mature cotton during the 1st WAA. A 1/16 X rate of 2,4-D caused less than 20% injury 1WAA while the 1/256 X was not statistically different from the untreated plots. Visual injury during the 3rd WAA was more pronounced and severe on younger cotton due to vegetative cotton crop. The injury response was slower on more mature cotton and could not identify any significant injury from 1/256 X rates on 10-16 node cotton.

Seed cotton yield indicated a stair-step pattern as decreasing rates resulted in less yield reductions when compared to the untreated controls. While injury was more visible on young cotton, the percent yield reduction was not different when compared to the mature cotton. The 5 site-years averaged 2534 lbs/A of seed cotton and yield reductions were 91% for the 1X rate, 74% for the 1/4 X rate, 55% for the 1/16 X rate, 33% for the 1/64 X rate and 13% for the 1/256 X rate. This study indicates significant yield loss can occur in many instances while providing minimal visual or NIR symptomology. In addition, these new weed control technologies will require caution and discipline to prevent detectable and/or undetectable injury