

**THE EFFECT OF COTTON GROWTH STAGE ON SUSCEPTIBILITY AND FRUITING PATTERNS
FOLLOWING EXPOSURE TO A SUB-LETHAL RATE OF 2,4-D**

J. T. Buol

D.B. Reynolds

D.M. Dodds

Mississippi State University

Mississippi State, MS

R.L. Nichols

Cotton Incorporated

Cary, NC

J.A. Mills

Monsanto Company

Collierville, TN

Abstract

The development and spread of herbicide-resistant (HR) weed species poses a serious challenge to crop producers tasked with feeding and clothing a surging global population with dwindling production resources. In response to the threat of HR weed species, seed companies have developed new crop biotechnologies that will incorporate the use of spray applications of the auxin hormone-mimic herbicides over the top of the major row crops. While these herbicides represent a powerful tool for controlling HR weed species, their highly efficacious nature means they are capable of severely damaging off-target species such as susceptible crops. 2,4-D (2,4-dichlorophenoxyacetic acid) represents one such auxin-hormone-mimic herbicide, and is particularly devastating to susceptible cotton (*Gossypium hirsutum* L.) cultivars even when exposure is only to a sub-lethal concentration of the herbicide. Misapplication events of sub-lethal concentrations of 2,4-D can occur at any point during the growing season, and thus may correspond to varying cotton growth stages. As such, research was conducted in each of two locations in Mississippi in 2014, 2015, and 2016 to determine the cotton growth stage most susceptible to injury and yield partitioning effects from simulated off-target applications of sub-lethal concentrations of 2,4-D. Results indicate that exposure to 2,4-D 6 to 8 weeks after emergence (WAE) results in significant yield loss, whereas exposure to 2,4-D from 2 to 6 WAE resulted in a reduction of yield partitioned on lower nodes and inner positions and an accompanying increase in yield partitioned on vegetative branches and aborted terminals.