EFFECTS OF LOW DOSE DEFOLIANT RATES ON LATE PLANTED COTTON IN GEORGIA

Lavesta C. Hand
A. Stanley Culpepper
John L. Snider
University of Georgia
Tifton, GA

Abstract

Off-target movement of pesticides has gained much attention over the past few years. This impacts the future of pesticide use and registration because of the impact placed on off-target movement by the endangered species act and the new process of reevaluating pesticides using the EPA's biological evaluations. In Georgia, pesticide drift incidences have declined since 2015, however there was a spike in defoliant drift cases in 2020 making it the number one drift complaint in Georgia. The number one crop defoliants drifted on was late planted cotton. Herbicide drift onto cotton has been thoroughly researched, but little is available on drift rates of defoliants on cotton. Four experiments were conducted in two locations in 2021 to evaluate the impact of defoliant drift rates on late planted cotton in Georgia. DP 2020 B3XF was planted on June 1 in Tifton, GA and June 8 in Midville, GA, with a dryland and irrigated field evaluated in each location. Treatments were applied when the earliest planted cotton in each location had reached 60% open boll. This was at approximately 2,066 DD60s in Tifton and 1,972 DD60s in Midville, but cotton was at first open boll at each location. Treatments were applied using a two-row backpack sprayer equipped with 11002 AIXR nozzles calibrated to deliver 15 gallons per acre. Defoliants and 1X rates were chosen based on what growers were using at the time applications were made and were as follows: Dropp (Thidiazuron) at 3.2 oz/acre, Folex (Tribufos) at 12 oz/acre, and Prep (Ethephon) at 40 oz/acre. Drift rates evaluated were 1/10, 1/25, 1/50, 1/100, 1/200, and 1/400 of the 1X rate for each individual defoliant. A nontreated control was included for comparison, resulting in a total of 19 treatments replicated four times in each location except for the irrigated Midville location (3 replicates). Visual injury was evaluated weekly for three weeks following application on a scale of 0 to 100%, with 0 being no injury and 100 being crop death. When the nontreated was at 60% open boll, the entire trial was defoliated and picked approximately two weeks later. Plots were ginned at the UGA Microgin to determine lint yields and fiber samples were sent to the classing office in Memphis, TN for fiber quality analysis. There was no treatment by location interaction, so all results were combined over location. Generally, visual injury increased as drift rate increased for each defoliant, however nonlinear regression did not note any differences in upper limit or slope. When evaluating means, the highest injury was noted at the 1/10 rate of tribufos (26%) and ethephon (18%). The 1/10 rate of all three defoliants, 1/25 rate of tribufos and ethephon, and the 1/50 rate of tribufos all noted higher injury than the nontreated control. Although differences in visual injury were noted, there was no significant difference in lint yield regardless of treatment (870 to 1,094 lbs/acre). The only fiber quality parameter that was impacted was micronaire, with only the 1/10 rate of ethephon reducing micronaire compared to the nontreated control. Although this treatment did reduce micronaire (3.93 µg/inch), it still was not in the discount range. Although these results demonstrated that a drift rate of a single defoliant may not reduce yield or quality outside of the premium range, it is rare that a single defoliant will be applied in Georgia. Future research will evaluate tank mixtures of these products at some of the drift rates utilized here, and this experiment will be conducted again in 2022.