## EVALUATION OF INSECTICIDE EFFICACY AT VARIOUS WASH-OFF INTERVALS G. Kyle Smith Michael T. Plumblee Jeremy K. Greene Clemson University Blackville, SC

## <u>Abstract</u>

Unexpected rainfall is common in the Southeastern United States during the summer months and often affects pesticide applications. As a result, farmers do not know the effectiveness of their insecticide applications if a rain event occurs shortly after the application has been made. Insecticide applications are important in cotton production in the South because of the impact insects have on the crop. There is an approximate 36% yield loss in cotton due to insect damage resulting in around \$19 loss per hectare annually in South Carolina. In South Carolina, Tobacco thrips, *Frankiella fusca* (Hinds), and stinkbugs (Pentatomidae) are two pests that cause significant yield and economic damage in cotton across the state each year. Previous research by Willis *et al.* (1994) reported that pesticide efficacy increased as the amount of time between when the insecticide application occurred and when the rainfall event happened. Furthermore, insecticide labels do not always provide exact rain fast information for optimum effectiveness. In order to provide farmers with recommendations on the rain fastness of commonly used insecticides in cotton, trials were implemented to simulate rainfall at various timing intervals after insecticide applications had been made for various pests in cotton.

An experiment was conducted at the Edisto Research and Education Center in Blackville, SC in 2021 to evaluate insecticide efficacy at various wash-off intervals. PHY 480 W3FE (fungicide only seed) was planted in 8-row plots of 96 cm row spacing and each plot was 12.1 m in length. Each treatment was replicated 4 times in a split-plot design. The treatments (wash-off interval timings) were untreated check, 0-30 minutes, 1-1.5 hours, 3-4 hours, 6-7 hours, and 24 hours after application. The treated plots were sprayed using a Bowman MudMaster Multi-Purpose sprayer. Acephate (Orthene 97% AW/W SG) was applied at 3-4 leaf cotton at a rate of 210 g/ha for the thrips application study. Bifenthrin (Brigade 2EC) was applied at a rate of 448 g/ha for the stinkbug application. After the treated plots were sprayed, a second MudMaster sprayer was used to simulate rainfall using TeeJet Flood Spray Tips and 378 L (0.3-inch rainfall) of water was applied per plot. All data was subjected to analysis of variance (ANOVA) using the PROC Glimmix procedure in SAS v9.4 and multiple pairwise t-tests were used to separate means at p = 0.05.

No significant differences in insecticides efficacy were observed in the thrips trial between wash-off interval and where insecticide was applied between adult or nymph thrips. The simulated rainfall did not impact thrips control where no insecticide was applied. Twelve days after the application of Bifenthrin, there was an increased control of stinkbugs where the insecticide was washed off 24 hours after application compared to the 0-30 minute and the 6-7 hour wash-off interval. Again, the simulated rainfall did not impact stinkbug control where no insecticide was applied. Both in thrips and stinkbug trial, the simulated rainfall did not have an impact on lint yield where the insecticides were sprayed. Continue research in refining the effects of insecticide wash-off intervals and begin evaluating spray adjuvants is needed to generate recommendations for the growers in South Carolina.