RESPONSE OF COTTON AT DIFFERENT GROWTH STAGES TO DRIFT RATES OF COMMONLY USED FORESTRY HERBICIDES

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Abstract

Timber production is an important agricultural industry in the South Carolina with 5.3 million hectares of forestland in 2019. Timber is harvested throughout the year, but mainly during the fall and winter months of the year. The land left fallow after harvest in preparation for transplanting of new seedling trees, usually nine to twelve months later. Herbicides are used during this fallow period to control undesirable trees, woody shrubs, and other herbaceous plants that may compete with the new crop of tree seedlings. Most of these plants are active during the summer months; therefore, plantation managers use helicopters equipped with a spray boom to aerially apply these herbicides. However, these aerial applications have the potential drift onto nearby cotton and other sensitive broadleaf crops. Cotton injury will depend on several factors including growth stage and the amount of drift received. Research is lacking on the effect of drift rates of triclopyr, metsulfuron, and sulfometuron on in-season cotton growth and development and yield. Field experiments were conducted at the Edisto Research and Education Center in 2019. Cotton variety Phytogen 480 W3FE was planted on May 16, 2019. The drift herbicide treatments were 1/10 X and 1/100 X of the normal use rates (X) of triclopyr at 4.48 kg/ha^{-1}, metsulfuron at 0.14 kg/ha^{-1}, and sulfometuron at 0.14 kg/ha^{-1}. An untreated check was included for comparison. The herbicide treatments were applied at vegetative growth stage (6-10 leaf) and reproductive growth stage (10-14d after 1st bloom). Percent cotton visual injury and heights for the two application timings were collected 7 and 14 days after treatment (DAT). Cotton was harvested at maturity on November 7, 2019. Percent cotton injury, height, and yield were analyzed using ANOVA and means separated at the P = 0.05 level. In the vegetative growth stage, metsulfuron at the 1/10X drift rate severely injured cotton at 14 DAT (>80%). Similarly, cotton injury was 55% at 14 DAT in the metsulfuron 1/100X drift rate treatment. Cotton heights were significantly reduced in metsulfuron 1/10X, metsulfuron 1/100X, and sulfometuron 1/10X treatments compared to the untreated check. In contrast, cotton treated with metsulfuron 1/10X and 1/100X at the reproductive growth stage showed moderate visual injury (37 and 16%, respectively) at 14 DAT. No significant differences in reproductive cotton heights at 14 DAT were observed across the treatments. Seed cotton yields were significantly reduced in the metsulfuron 1/10X drift rate treatment (vegetative and reproductive application timings) treatment and sulfometuron at the 1/10X drift rate (reproductive timing). In conclusion, cotton was the most sensitive to the drift rates of metsulfuron and sulfometuron. This information will help growers determine the effects of these herbicides on cotton growth and development and potential yield losses from drift.