RESPONSE OF COTTON TO IMAZAPYR, TRICLOPYR, AND METSULFURON

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Abstract

In South Carolina, timber production is an important agricultural industry. In production, there are 5.3 million hectares of forested with approximately 53 and 47% in hardwood and softwoods, respectively. The landscape in South Carolina has a mixture of these timber production areas along with land in row crop production in close proximity. Vegetation management in these forested areas often requires aerial applications using helicopters. In addition, these sprays are done in the middle of the production season for cotton. Drift concerns and damage is a potential problem for cotton producers near these timber production areas. Drift from these sprays can affect crop growth and yield, especially during flowering and fruiting periods. Therefore, research is lacking on the effect of drift rates of imazapyr, triclopyr, and metsulfuron on cotton growth and yield. Field experiments were conducted at the Clemson University Edisto Research and Education Center. Cotton variety Deltapine 1850 B2XF was planted on May 31, 2020. The drift herbicide treatments were 1/10 X and 1/100 X of the normal use rates (X) of imazapyr at 0.11 kg/ha, triclopyr at 4.48 kg/ha, and metsulfuron at 0.14 kg/ha. 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) for the vegetative growth stage and 14 and 28 DAT for the reproductive growth stage. Cotton was harvested at maturity on November 16, 2020. Percent cotton injury, height, and yield were analyzed using ANOVA and means separated at the P = 0.05 level. In the vegetative growth stage, the 1/10X drift rate of metsulfuron, triclopyr, and imazapyr injured cotton 74, 70, and 66% at 14 DAT, respectively. Cotton injury from the 1/100X metsulfuron was significantly higher than equivalent drift rates of triclopyr and imazapyr. Cotton heights were significantly reduced in metsulfuron 1/10X, metsulfuron 1/100X, triclopyr 1/10X, and imazapyr 1/10X compared to the untreated check. In the reproductive growth stage, cotton treated with 1/10X rates of metsulfuron, triclopyr, and imazapyr were 91, 93, and 75% at 28 DAT, respectively. Similar to the vegetative growth stage, cotton injury from metsulfuron 1/100X was significantly higher than triclopyr and imazapyr at 1/100X. Seed cotton yields were severely reduced in the 1/10X drift rates of metsulfuron, triclopyr, and imazapyr treatments. The reproductive growth stage was more sensitive to the 1/10X rate compared to the 1/100X rate in all herbicides. In summary, cotton injury was severe at the drift rates tested in this study. The study showed that even low drift levels of these herbicides will result in severe yield reduction in cotton.