IMPACT OF REDUCED RATES OF ISOXAFLUTOLE ON COTTON GROWTH AND YIELD

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Abstract

Crops grown in close proximity along with similar equipment being utilized in multiple in-season applications come with many potential challenges involving off-target movement of herbicides or sprayer contamination. These added concerns justify research identifying possible deleterious effects on crops such as cotton. Therefore, a field study was conducted in 2019 at the Northeast Research Station near St. Joseph, La with the objective to evaluate potential negative impacts of reduced rates of isoxaflutole on cotton growth and yield. A four-replication factorial arrangement of treatments was used and included herbicide application timing (Factor A: cotyledon, 2-lf, 4-lf) and herbicide treatment (Factor B: no herbicide or isoxaflutole @ 1x (0.094 lb ai/A), 1/8x, or 1/16x). Treatments were applied at designated timings following planting of DP1646B2XF cotton on 6/10. Parameter measurements included visual crop injury 7 and 14 d after application (DAT) (chlorosis, necrosis, and height reduction), crop height 14, 28, and 42 DAT as well as prior to harvest, and yield.

At 7 DAT, within each herbicide rate, a stepwise decrease in injury was observed as application was delayed to each larger growth stage for both the 1x (98 to 74 down to 44%) and 1/8x (66 to 35 down to 21%) rates. At the lowest herbicide rate, injury was greatest at the cotyledon timing (54 vs 25 and 26%). Within each application timing, a stepwise reduction in injury was observed as herbicide rate was decreased for both the cotyledon (98 to 66 down to 54%) and 2-lf (74 to 35 down to 25%) timings. At the 4-lf timing, the 1x rate resulted in 44% injury, which was greater than the 21 and 26% observed for the 1/8 and 1/16x rates, respectively. At 14 DAT, within each herbicide rate, the 1x rate resulted in greater injury at the cotyledon (98%) and 2-lf (94%) timing in comparison with the 4-lf timing (53%). At both the 1/8x (71 vs 30 and 21%) and 1/16x (49 vs 20 and 25%) rates, injury was greatest at the cotyledon timing. Within each application timing, a stepwise reduction in injury was observed as herbicide rate was decreased for the cotyledon timing (98 to 71 down to 49%). At both the 2- and 4-lf timings, the 1x rate resulted in 94 and 53% injury, respectively, which was greater than the 30 and 20 and 21 and 25% observed for the 1/8 and 1/16x rates.

At 14 DAT, averaged across application timing, cotton height reduction in comparison with no herbicide application was 38% for the 1x herbicide rate, which was greater than the 24 and 21% observed for the 1/8 and 1/16x rates, respectively. Results were similar at 28 DAT with the 1x rate resulting in a 69% reduction which was greater than the 20 and 15% observed at the respective lower rates. At 42 DAT, within each application timing, cotton height for the cotyledon timing was reduced 89% for the 1x rate in comparison with no herbicide application which was greater than the 25 and 18% observed for the 1/8 and 1/16x rates, respectively. For the 2-lf timing, height was reduced at only the 1x (83%) and 1/8x (13%) rates. For the 4-lf timing, height was reduced only at the 1x rate (27%). Prior to harvest, within each application timing, at both the cotyledon and 2-lf timing, cotton height was reduced when compared to no herbicide application 7 and 24%, respectively, at the 1x rate. Height was not reduced for any rate at the 4-lf timing.

Within each herbicide rate, the 1x rate significantly reduced cotton yield in comparison with no herbicide application 99 and 98% at the cotyledon and 2-lf timings, respectively, which was greater than the 39% reduction observed at the 4-lf timing. At the 1/8x rate, yield was only reduced at the cotyledon timing (33%). At the lowest herbicide rate, cotton yield was only reduced at the cotyledon (26%) and 4-lf (19%) timings. Within each application timing, at the cotyledon timing, cotton yield was reduced 99% which was greater than the 25 and 18% observed for the 1/8 and 1/16x herbicide rates, respectively. At the 2-lf timing, yield was reduced only at the 1x rate (98%) while at the 4-lf timing, yield was reduced only at the 1x (39%) and 1/16x (19%) rates.