IMPACT OF REDUCED RATES OF MESOTRIONE ON COTTON GROWTH AND YIELD

D. K. Miller
D. O. Stephenson IV
LSU AgCenter
Baton Rouge, LA

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 mesotrione on cotton growth and yield. A four replication factorial arrangement of treatments was used and included herbicide application timing (Factor A: cotyledon; 2-lf; or 4-lf) and herbicide treatment (Factor B: no herbicide or mesotrione @ 1x (0.156 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), crop height 14, 28, and 42 DAT, 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 the 1x (98 to 74 down to 44%), 1/8x (66 to 35 down to 21%), and 1/16x (98 to 35 down to 6%) rates. Within each application timing, at the cotyledon timing, injury was 98% for all herbicide rates applied. At the 2-lf timing, a significant stepwise reduction in injury was observed as rate decreased from 1x (75%) to 1/8x (45%) down to 1/16x (35%). At the 4-lf timing, injury was greatest for the 1x rate (41%) and greater than the 13 and 6% observed for the 1/8 and 1/16x rates, respectively. At 14 DAT, within each herbicide rate, a stepwise decrease in injury was observed as application was delayed to each larger growth stage for the 1x (98 to 81 down to 60%), 1/8x (98 to 40 down to 11%), and 1/16x (90 to 33 down to 1%) rates. Within each application timing, at the cotyledon timing injury was at least 90% and equal for all rates applied. At the 2-lf timing, a significant stepwise reduction in injury was observed as rate decreased from 1x (81%) to 1/8x (40%) down to 1/16x (33%). At the 4-lf timing, injury was greatest for the 1x rate (60%) and greater than the 11 and 1% observed for the 1/8 and 1/16x rates, respectively.

At 14 DAT, within each application timing, at the cotyledon timing a significant stepwise decrease in height reduction was observed as herbicide rate decreased from 1x (95%) to 1/8x (59%) down to 1/16x (36%). At the 2-lf timing, height reduction was greatest for the 1x rate (45%) and greater than the 21 and 31% observed at the 1/8 and 1/16x rates, respectively. At the 4-lf timing, cotton height was only reduced at the 1x rate (32%). At 28 DAT, within each application timing, at the cotyledon timing cotton height was reduced equally at the 1x and 1/8x rates (87%) and greater than the 1/16x rate (53%). At the 2-lf timing, greatest height reduction was observed at the 1x rate (62%) while the 1/8 and 1/16x rates resulted in equal height reduction of 31 and 26%, respectively. At the 4-lf timing, cotton height was only reduced at the 1x rate (30%). At 42 DAT, within each application timing, at the cotyledon timing cotton height reduction was 93% at the 1x and 1/8x herbicide rates and greater than the 40% observed for the 1/16x rate. At the 2-lf timing, the 1x rate reduced height 49%, which was greater than the 19% observed for the 1/8x rate. Height reduction was not observed for any timing at the 1/16x rate. At the 4-lf timing, cotton height was only reduced at the 1x rate (18%).

Within each herbicide rate, a significant stepwise decrease in cotton yield reduction in comparison with no herbicide applied was observed as herbicide rate decreased from 1x (97%) to 1/8x (86%) down to 1/16x (37%). At the 1/8x and 1/16x rates, yield was only reduced at the cotyledon timing (94% and 68%, respectively). Within each application timing, at the cotyledon timing, cotton yield was reduced 97 and 94% at the 1x and 1/8x rates, respectively, and greater than the 68% observed for the 1/16x herbicide rate. At the 2- and 4-lf timing, yield was reduced only at the 1x rate (86 and 37%, respectively).