STONEVILLE COTTON RESPONSE TO LOW RATES OF DICAMBA AND 2,4-D

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Abstract

Two new technologies have recently entered the market that will allow producers to spray dicamba or 2,4-D over-the-top of cotton (*Gossypium hirsutum*) and soybean (*Glycine max*). Dicamba-tolerant soybean and cotton are commercially available and marketed as "Xtend". 2,4-D tolerant crops will be called "Enlist". Although new technologies are beneficial for the control of herbicide-resistant weeds, there are concerns with the application of these herbicides with off-target movement, or drift. A field study was conducted in 2020 at the Delta Research and Extension Center, in Stoneville, Mississippi, to evaluate response of cotton growth stages from low rates (simulated drift) of 2,4-D and dicamba. Stoneville (ST 4550) cotton was planted (four-row plot) on May 11, 2020 and emerged on May 18. The experiment was designed as a randomized complete block with a three (cotton growth stage) by two (herbicide) by four (herbicide rate) factorial treatment arrangement. Applications were made (two center rows) at three cotton growth stages: three- to four-leaf (June 7), at square (June 30), and at flowering (July 15). Dicamba and 2, 4-D were applied at 1/16 X, 1/32 X, 1/64 X, and 0 X (nontreated check) rates of the labeled rate (1 X). The labeled rate (1 X) of dicamba and 2,4-D were 16 and 32 fl oz/A, respectively.

Cotton injury from dicamba application was 1 and 0, 20 and 9,12 and 4%; and it was 39 and 14, 30 and 30, 13 and 18% from 2,4-D application at three- to four-leaf, square, and flowering stages 10 and 15 weeks after emergence (WAE), respectively (averaged over rates). Cotton canopy closure was 99, 95, and 97% for dicamba and 97, 72, and 90% for 2,4-D at three- to four-leaf, square, and flowering stages 15 WAE, respectively (averaged over herbicide rates). Cotton canopy closure in the nontreated plot was 100%. The percentage of cotton boll opening was 93, 69, and 78% for dicamba, and 26, 27, and 30% for 2,4-D at three- to four-leaf, square, and flowering stages 18 WAE, respectively (averaged over herbicide rates). The cotton boll opening in the nontreated plot was 97%. Seedcotton yield was 3,728; 2,717; and 2,861 lb/A for three- to four-leaf, square, and flowering stages (averaged over herbicides and rates), respectively. Seedcotton yield was 4,020 and 2,184 lb/A for dicamba and 2,4-D, respectively (averaged over growth stages and herbicide rates). Seedcotton yield decreased as herbicide simulated drift rate increased. Plots received dicamba applications yielded 4,327; 3,910; and 3,823 lb/A seedcotton and plots received 2,4-D applications yielded 3,130; 1,523; and 1,898 lb/A seedcotton yield at three- to four-leaf, square, and flowering stages, respectively (averaged over herbicide rates). Seedcotton yield in the nontreated plot was 4,237 lb/A. Cotton can recover from injury when dicamba drift occurs at early cotton growth and development stages. Cotton can be injured significantly from 2,4-D drift at any growth stage. Cotton was more sensitive to 2,4-D than dicamba. Overall, the sensitivity of cotton growth stage from simulated drift rates of 2,4-D and dicamba were as follows: square > flowering > three- to four-leaf stage.