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

T. Bararpour
R.R. Hale
Dr. Chastain
Mississippi State University
Stoneville, MS.

Abstract

Weed control by use of herbicides is an important tactic in successful crop production. Two new technologies have recently entered the market that will allow producers to spray dicamba or 2,4-D over-the-top of cotton and soybean. 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. Field studies were conducted in 2019 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 4949) cotton was planted (four-row plot) on May 24, 2019 and emerged on May 28. 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 14), at square (July 8), and at flowering (July 18). 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 was 11 and 0, 25 and 3, 15 and 3% for dicamba, and for 2,4-D was 24 and 0, 29 and 28, 26 and 29% at three- to four-leaf, square, and flowering stages 10 and 16 weeks after emergence (WAE), respectively (averaged over rates). Cotton canopy closure was 82, 70, and 80% for dicamba and 72, 66, and 78% for 2,4-D at three- to four-leaf, square, and flowering stages 10 WAE, respectively (averaged over herbicide rates). Cotton canopy closure in the nontreated plot was 87%. The percentage of cotton boll opening was 46, 36, 53% for dicamba and 21, 21, and 22% for 2,4-D at three- to four-leaf, square, and flowering stages 17 WAE, respectively (averaged over herbicide rates). The cotton boll opening in the nontreated plot was 77%. Seedcotton yield was 4,496; 2,888; and 2,969 lb/A for three- to four-leaf, square, and flowering stages (averaged over herbicides and rates), respectively. Seedcotton yield was 4,592 and 2,309 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 5,126; 4,295; and 4,355 lb/A seedcotton and plots received 2,4-D applications yielded 3,865; 1,481; and 1,582 lb/A seedcotton at three- to four-leaf, square, and flowering stage, respectively (averaged over herbicide rates). Seedcotton yield in the nontreated plot was 5,373 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. 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. Cotton was more sensitive to 2,4-D than dicamba.