RESPONSE OF COTTON GROWTH STAGES FROM SIMULATED DRIFT RATES OF 2,4-D AND DICAMBA T. Barardour

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ABSTRACT

Glyphosate susceptibility in many weed species has decreased. Row crops with genetically modified (GM) tolerance to dicamba are available to combat glyphosate-resistant weeds. Two separate studies were conducted at the Delta Research and Extension Center, in Stoneville, Mississippi, in 2017 to evaluate cotton (Stoneville Bollgard II 4747GLB2) response at three growth stages to simulated drift rates of 2,4-D (first study) and dicamba (second study). The experiment was designed as a randomized complete block with a 3 (cotton growth stage) by 4 (herbicide rate) factorial treatment arrangement. Each treatment was replicated four times. Applications were made at three cotton growth stages: three- to four-leaf, at square, and at flowering. Dicamba and 2, 4-D were applied at 1/16 X and 1/32 X (simulated drift rates) rates of the labeled rate (1 X). A nontreated check was included. The labeled rate (1 X) of dicamba and 2,4-D were 16 and 32 fl oz/A, respectively.

Cotton injury was not different for both rates of dicamba without NIS; however, the addition of NIS significantly increased injury 10 wk after emergence (WAE). Cotton recovered from injury when dicamba was applied at three-to four-leaf stage compared to square or cotton flowering stage at 10 WAE. Cotton injury increased as dicamba rate increased. Overall, the addition of NIS increased cotton injury regardless of dicamba rates or cotton growth stages. In general, at 20 WAE, cotton height was less effected from dicamba applications regardless of dicamba rates or cotton growth stages except for dicamba (1/16 X) applications at square and flowering stage of cotton. Cotton injury from simulated drift rates of dicamba was 1, 17, and 22% (10 WAE) and cotton height reduction was 6, 7, and 11% for three- to four-leaf, square, and flowering stage, respectively (averaged over rates). Cotton can recover from injury when dicamba drift occurs at early cotton growth and development stages. The most damaging cotton stage from dicamba drift is when exposure occurs during flowering stage.

Both 2,4-D rates injured cotton at the same level (34 to 37%). The addition of NIS to 2,4-D application increased cotton injury for both 2,4-D rates. The level of cotton injury in terms of growth stage was as follows: three- to four-leaf = square > flowering stage. Cotton did not recover from injury when 2,4-D was applied at three- to four-leaf stage. Overall, the addition of NIS increased the level of cotton injury regardless of 2,4-D rates or cotton growth stages. All 2,4-D treatments decreased cotton height compared to nontreated check at 20 WAE. These data indicate that 2,4-D stopped/delayed cotton growth from the time of applications and there was no recovery from 2,4-D injury. Therefore, the most damaging stage of cotton from 2,4-D drift occurs at early growth stage. In general, cotton is very susceptible to 2,4-D drift. Cotton injury from simulated drift rates of 2,4-D was 32, 36, and 26% (10 WAE) and cotton height reduction was 18, 27, and 29% for three- to four-leaf, square, and flowering stage, respectively (averaged over rates). 2,4-D drift at any cotton growth stage can injure cotton significantly.