RESPONSE OF COTTON TO LOW RATES OF DICAMBA AT DIFFERENT GROWTH STAGES

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Abstract

A major issue facing cotton (*Gossypium hirsutum*) growers in Mississippi is the use of dicamba on neighboring crops. Cotton is sensitive to dicamba due to its growth and development habits. A field study was conducted in 2018 at the Delta Research and Extension Center in Stoneville, MS. The objective was to evaluate response of cotton to low rates of Engenia (dicamba) at three growth stages. Cotton (Stoneville 4747 – ST4747GLB2) was planted on beds with 40-inch row spacing at 4 seeds ft^{-1}. This study was designed as a three (cotton growth stage) by five (treatment) factorial arrangement in a randomized complete block. Each treatment was replicated four times. Applications were made at three growth stages: 3- to 4-leaf, beginning square, and beginning flowering. Engenia treatments were 1/16 X and 1/32 X of the labeled 1X rate. Treatments were as follows: 1) Engenia at 1/16 X; 2) Engenia at 1/16 X + NIS (non-ionic surfactant) at 0.25% (v/v); 3) Engenia at 1/32 X; 4) Engenia at 1/32 X + NIS. A nontreated check was included as the fifth treatment. The labeled rate (1 X) of Engenia is 12.8 fl oz/a.

Cotton injury from Engenia was significantly greater at 1/16 X rate than 1/32 X rate. The addition of NIS did not show any significant difference in terms of injury for the 1/16 X or 1/32 X rates. Cotton at three- to four-leaf (vegetative) stage showed greater visual injury than square and flowering (reproductive) stages. Visual injury on cotton at 9 wk after emergence (WAE) was greater than 12 and 14 WAE. Engenia at 1/16 X (with and without NIS) caused 14.4% visual injury at 9 WAE. Engenia at 1/32 X and 1/32 X + NIS caused 8.9 and 10.6% visual injury 9 WAE, respectively. In terms of height, cotton showed greater height reduction when applications of Engenia were made with NIS. Engenia at 1/32 X, 1/16 X, 1/32 X + NIS, and 1/16 X + NIS reduced cotton height 2, 5, 5.8, and 8.5%, respectively. Regardless of rates with and without NIS, Engenia applied to cotton at reproductive stages significantly reduced the amount of open bolls. Engenia applied to cotton at square and flowering stages had 32 and 34% fewer open bolls as compared to applications made at three- to four-leaf stage, respectively. Seedcotton yield decreased when Engenia was applied at higher rates. Engenia applied at reproductive stages resulted in lower seedcotton yield than applications made at vegetative stage. Engenia applied at 1/32 X and 1/32 X + NIS at vegetative stage did not show significant seedcotton yield reduction, but did show a numerical yield reduction. At square stage, seedcotton yield was reduced 18 and 22.7% when Engenia was applied at 1/32 X and 1/16 X rates, respectively. At flowering stage, seedcotton yield was reduced 24 and 32% after applications of Engenia at 1/32 X and 1/16 X rates were made on cotton at flowering stage, respectively. In general, cotton can recover from injury when low rates of Engenia occur at vegetative stages. Cotton expresses fewer open bolls when exposure to Engenia occurs at reproductive stages. Higher rates of Engenia at reproductive cotton stages resulted in greater seedcotton yield loss. The most damaging cotton stage from Engenia was during flowering.