EVALUATION OF A NEW FLURIDONE PREMIX FOR PALMER AMARANTH CONTROL IN COTTON

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Abstract

Fluridone is a herbicide that was initially evaluated for use in cotton in the early 1970s. Although crop safety was apparent, the high cost of production and insufficient control of key weed species from that time period kept it from becoming commercialized for use in cotton. Glyphosate-resistant (GR) Palmer amaranth (*Amaranthus palmeri*) is the most troublesome weed species of cotton in most states. Efficacious herbicide programs for controlling this weed are costly and must contain multiple modes of action applied throughout the crop. Typical programs include herbicide applications at burndown, at planting, twice topically, and again at layby, with each application typically including a mixture of herbicides that provide both postemergence and residual weed control. Fluridone is marketed outside the aquatic market under the trade name Brake® through several Section 18 approvals and inhibits the synthesis of carotenes. Since fluridone's use is very small agronomically, Brake has the potential to provide an alternative mechanism of action for Palmer amaranth control. However, a large amount of precipitation (approximately 0.75 inches), is required for activation often causing inconsistencies in weed control. This can cause weed control to be inconsistent. A premix of fluridone and fomesafen was recently released to help alleviate this problem as fomesafen can be activated with approximately 0.25 inches of precipitation. Research was conducted to evaluate rates of fluridone and fomesafen, in comparison to the new premix herbicide and other industry standards for weed efficacy and crop tolerance.

Research was conducted in 2014 in Jackson, TN, Milan, TN, and Garden Valley, GA. Treatments were arranged within a randomized complete block design with three replications at Milan and four at Jackson and Garden Valley. Treatments included Reflex at 0.063, 0.125, 0.188, and 0.25 lb ai/A, Brake at 0.05, 0.1 0.15 and 0.2 lb ai/A, Brake F2 at 0.125 + 0.2 (1X), 0.188 + 0.3 (1.5X), and 0.25 + 0.4 (2X) lb ai/A of fomesafen and fluridone respectively. Comparison treatments of Reflex + Warrant at 0.188 + 1.125 lb ai/A, respectively, and Direx + Warrant at 0.75 + 1.125 lb ai/A, respectively, were also included. Treatments were separated into two data sets that (1) compared corresponding rates of Reflex and Brake to those of Brake F2 and (2) compared Brake F2 to mixtures of Reflex + Warrant and Direx + Warrant. Cotton planting dates and varieties were reflective of those typically utilized by producers at each location. Treatments were applied with a backpack sprayer calibrated to deliver 15 gallons per acre. Crop injury was assessed 7, 14, and 21 DAT, and control of Palmer amaranth was assessed 14, 21, 28, and 35 DAT. All data were subjected to analysis of variance (ANOVA) and means separated using Fishers protected LSD with $\alpha = 0.05$.

In the first data set, a similar trend was present for Reflex and Brake applied alone or in combination as Brake F2 for crop injury and weed control, however for brevity only data from Brake F2 at the 1X rate with corresponding rates of Reflex and Brake are presented. Injury among these treatments was less than 7% and no differences were present 7 and 14 DAT. However, Brake F2 controlled more Palmer amaranth (93%) than Reflex or Brake (57 and 87%, respectively) alone 28 DAT. In the second data set, control from each rate of Brake F2 varied among locations at each rating interval. Weed control from each rate of Brake F2 at Jackson was similar to or greater than that of comparison treatments 35 DAT, however, control from Brake F2 from Garden Valley was less than that of comparison treatments at each location at this rating.

While Brake F2 shows great potential for providing a "new" mechanism of action for controlling Palmer amaranth, inconsistencies among locations indicate a need for more research to determine which factors could be causing these discrepancies. Future research will be centered on evaluating Brake F2 on different soil types and moisture environments and evaluating different ratios of fomesafen and fluridone for crop safety and weed efficacy.