COMPARISON OF FLURIDONE-BASED PREPLANT BURNDOWN PROGRAMS IN SOUTHEAST

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<u>Abstract</u>

The spread of herbicide resistant weeds, including Palmer amaranth, across the southeastern United States has growers in need of new herbicide alternatives. Fluridone herbicide inhibits the carteniod biosynthesis pathway in susceptible plants. Cotton tolerance to fluridone was established during its early development as a herbicide in the late 1970's. However, fluridone was not marketed in cotton due to cost concerns. In the past, fluridone successfully controlled Amaranthus spp. Efficacy of fluridone on Palmer amaranth (AMAPA) was lacking. Therefore, field studies were initiated and conducted across the southeast to determine the efficacy of various combinations of preplant, preemergence, and postemergence herbicide programs for AMAPA control in cotton. Field experiments were conducted at the Clemson University Edisto Research and Education Center (EREC) located near Blackville, SC; a grower field located near Mt. Olive, NC, and a grower field located in Macon County, GA in 2012. Experimental design consisted of a randomized complete block design with 4 replications. Preplant burndown herbicides were applied on April 18, 2012; April 20, 2012; and April 13, 2012; at EREC, Macon County, and Mt. Olive, respectively. Preemergence (PRE) herbicides were applied on May 22, 2012; May 11, 2012; and May 7, 2012 at EREC, Macon County, and Mt. Olive, respectively. Postemergence (POST1) on June 13, 2012, May 30, 2012, and May 31, 2012 at EREC, Macon County, and Mt. Olive, respectively. Postemergence (POST2) on June 25, 2012, June 15, 2012, and June 13, 2012 at EREC, Macon County, and Mt. Olive, respectively. Preplant burndown herbicide treatments included glyphosate at 0.75 lb ae/A plus 2,4-D at 0.5 lb ai/A, glyphosate plus 2,4-D plus flumioxazin at 0.064 lb ai/A, glyphosate plus 2,4-D plus fluridone at 0.25 lb ai/A, and glyphosate plus 2,4-D plus fluridone 0.38 lb ai/A. Preemergence (PRE) treatments included paraquat at 0.75 lb ai/A, reflex at 0.25 lb ai/A, and diuron at 0.5 lb ai/A. All treatments were followed by two postemergence application of glufosinate at 0.53 lb ai/A, with the exception of the check. Preplant AMAPA percent control ratings were collected at the preemergence herbicide application timing, PRE AMAPA percent control ratings were collected at the POST1 timing, and POST1 AMAPA control ratings were collected at the POST2 timing. Palmer amaranth control data were analyzed using ANOVA and means separated at the P = 0.05 level. At the EREC site, approximately 0.5 in precipitation occurred within 7 days after preplant application. Flumioxazin and fluridone at 0.38 lb ai/A preplant treatments provided highest AMAPA control (96-99%). At POST1, all treatments containing a residual burndown and/or residual PRE treatment provided 94% or better AMAPA control. At the Mt. Olive site, approximately 0.6 in precipitation within 7 days after preplant application. At the POST1 application, PRE AMAPA control was greater than 95% with flumioxazin and fluridone at 0.38 lb ai/A preplant alone or followed by fomesafen plus diuron plus paraquat PRE. After POST2, POST 1 AMAPA control was 98% or better following two applications of glufosinate regardless of residual program. At the Macon County site, very little precipitation occurred within 7 days after preplant application. Palmer amaranth control at planting was better with preplant flumioxazin (77%) compared to both rates of preplant fluridone (52-59%). AT POST2, POST 1 glufosinate following either preplant flumioxazin or preplant fluridone following diuron plus fomesafen at plant provided greater than 99% AMAPA control. In conclusion, fluridone needed about 0.5 in rainfall within 7 days of application to activate. Under dry conditions, AMAPA control from preplant flumioxazin was greater than fluridone regardless of rate. In contrast, AMAPA control was similar between prelant flumioxazin and fluridone during normal precipitation. At POST1, benefit from residuals was evident compared to the glufosinate only programs. Fluridone did seem to slow emerged AMAPA allowing POST treatments better control of escapes and suppress future weed flushes.