

EFFECTIVENESS OF COTTON HERBICIDES ON GLYPHOSATE-RESISTANT PALMER AMARANTH POPULATIONS IN ARKANSAS. E. A. L. Alcober^{1*}, N. R. Burgos¹, K.L. Smith², L.E. Estorninos¹, T. M. Tseng¹, S. Fogliato¹ and R.A Salas¹; ¹University of Arkansas, Fayetteville, AR and ²University of Arkansas, Monticello, AR

ABSTRACT

Herbicide-resistant Palmer amaranth has been spreading exponentially; becoming a major problem in the southern US. In Arkansas, 19 counties were confirmed to have glyphosate-resistant Palmer in 2008. Managing herbicide-resistant Palmer amaranth can be achieved by using herbicides with different modes of action. Hence, this study was conducted to evaluate the effectiveness of various cotton herbicides on Palmer amaranth. A greenhouse bio-assay was conducted in 2009, evaluating 3 foliar herbicide (pyrithobac, glyphosate, fomesafen) applied at 0.25x, 0.50x, 1x, 2x, and 4x; and 4 soil-applied (fomesafen, pendimethalin, diuron, S-metolachor) sprayed at 0.25x, 0.50x, 1x, 2x. The 1x rates were: pyrithobac , 0.065 lb ai/A + 0.25% NIS; glyphosate , 0.75 lb ae/A; fomesafen (foliar) , 0.235 lb ai/A + 1% COC; pendimethalin and diuron, 1.0 lb ai/A; S-metolachor , 1.27 lb ai/A and fomesafen (soil), 0.25 lb ai/A.

Thirteen Palmer amaranth populations were evaluated. Ten plants that escaped from a glyphosate-based weed control program were selected randomly within a population. Glyphosate-resistant Palmer was observed in Mississippi (MIS-B), Lonoke (LON-A), Crittenden (CRI-A) and Craighead (CRA-A) populations. Mississippi and Crittenden populations were resistant to 2x rate. Lonoke and Mississippi population had an LD₉₅ of 1.31 and 2.18 lb ae/A, respectively. All populations were resistant to Staple 3.2LX. The LD₅₀ and GR₅₀ ranged from 0.078 to 0.237 lb ai/A and 0.114 to 0.286 lb ai/A, respectively. The foliar application of Flexstar (fomesafen) controlled Palmer amaranth 100% at the 1x rate. 100% control was recorded for all Palmer amaranth populations sprayed with Dual Magnum and Reflex at 1x rate. Diuron controlled Palmer amaranth at 0.5x rate. The 1x rate of Prowl controlled Palmer amaranth, except the Lee-C population with only 82% mortality. Pendimethalin, diuron, fomesafen and S-metolachor are viable options for the control of glyphosate-R Palmer amaranth in cotton but not ALS herbicides. Integration of effective herbicides into glyphosate-based production system will control glyphosate-resistant Palmer amaranth and mitigate resistance evolution.