EFFICACY OF ENLIST DUO™ (GLYPHOSATE + 2,4-D) ON GLYPHOSATE-RESISTANT PALMER AMARANTH: A SUMMARY OF TRIALS IN ENLIST™ COTTON

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Abstract

Glyphosate-resistant Palmer amaranth is the most troublesome weed of cotton throughout the Southeast and Midsouth regions of the Cotton Belt. Dow Agrosciences has developed a transgenic cotton (Enlist cotton), which allows for topical applications of glyphosate, 2,4-D, and glufosinate. Experiments were conducted in 2010, 2011, and 2012 at various locations across the Southeast and Midsouth in fields infested with glyphosate-resistant Palmer amaranth. Different experimental treatments (weed control programs) were evaluated each year, but the overall objective was to develop and test weed control programs for control of glyphosate-resistant Palmer amaranth. In 2010 and 2011, the objective was to evaluate the efficacy of various postemergence-applied 2,4-D containing treatments on glyphosate-resistant Palmer amaranth with or without residual weed management programs in Enlist cotton. Similarly in 2012, weed control programs were evaluated; however, all weed control programs contained a soil-applied herbicide at planting. In 2010, fomesafen at planting provided 13% greater residual control of glyphosate-resistant Palmer amaranth than did pendimethalin. The efficacy of 2,4-D was enhanced by either the addition of a preemergence herbicide to the program or glufosinate as a postemergence tank-mix partner. Furthermore, glufosinate was superior to glyphosate as a tank-mix partner with 2,4-D. In 2011, application of a preemergence herbicide, either fomesafen or fluometuron, increased glyphosate-resistant Palmer amaranth control as well as adding an additional mode of action to the weed control program. In the absence of a preemergence herbicide, Enlist Duo™ (a product mixture of 2,4-D choline + glyphosate) and 2,4-D choline in conjunction with glufosinate provided 93 to 98% control through 1 to 2 weeks after layby. Conversely, multiple applications of glufosinate alone were not effective. Although several treatments provided good control, glufosinate was the best tank-mix partner with 2,4-D choline and Enlist Duo, which was often superior to tank-mixes with *S*-metolachlor and pyrithiobac. In 2012, two applications of glyphosate following a preemergence herbicide were ineffective in controlling glyphosate-resistant Palmer amaranth. Glufosinate was the best tank-mix partner with Enlist Duo based on the level and consistency of glyphosate-resistant Palmer amaranth control. Additional herbicide tank-mix partners that were less effective or inconsistent included *S*-metolachlor, acetolachlor, and pyrithiobac. Overall conclusions drawn from these trials were: 1) preemergence herbicides are vital to ensure a high level of consistent

glyphosate-resistant Palmer amaranth control in Enlist cotton and to protect against resistance to postemergence herbicides, 2) the addition of glufosinate to Enlist Duo improves consistency of glyphosate-resistant Palmer amaranth control, and 3) the combination of glufosinate and 2,4-D is vital for protecting both herbicides against resistance in areas heavily infested with glyphosate-resistant Palmer amaranth. Questions still remain as to whether glufosinate plus Enlist Duo can be applied in a manner that achieves both acceptable weed control and adequate drift reduction.