

Southeastern Experience with Herbicide Resistance

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Glyphosate-resistant Palmer amaranth has changed agriculture forever in the Southeast. To combat this pest, growers rely heavily on herbicides, tillage, and hand weeding. Herbicide use has increased sharply with 2.5 times more herbicide active ingredient applied in cotton today as compared to before resistance. Use of most herbicides, except glyphosate, have risen sharply, although the residual herbicides (acetochlor, diuron, flumioxazin, fomesafen, pendimethalin, S-metolachlor, trifluralin) and glufosinate have increased the most. Although growers spend \$68/A on herbicides, control is not adequate. Thus, ninety-two percent of Georgia cotton growers are hand weeding 52% of the crop with an average cost of \$11.40 per hand weeded acre. In addition to increased herbicide use and hand weeding, growers are relying on soil disturbance for the control of Palmer amaranth; presently, in-row cultivation, deep turning, and tillage for the incorporation of herbicides are each being used on 20 to 30% of the cotton acreage. Current management programs are diverse, complex, and expensive, but were more successful at controlling glyphosate-resistant Palmer amaranth in 2012 as compared to the strategies employed during the previous eight years. In fact, hand weeding costs were reduced by half in 2012 as compared to 2011, saving Georgia cotton growers nearly \$7.7 million. Several factors were critical in obtaining better management during 2012, but growers being more aggressive and making wise decisions had the greatest influence.

Although these management programs are more effective, they are not economically sustainable and are still too dependent on herbicides. Therefore, an effort is underway to help growers integrate a heavy rye cover crop into their weed management program. Research results show that, if an adequate stand is achieved, rye itself, after being rolled, can reduce Palmer amaranth emergence 65 to 95%. Although the rye cover does not provide sufficient control when used alone, the rolled rye cover in conjunction with a sound herbicide program has proven extremely effective. In two large on-farm (4-8 A) dry land cotton studies conducted during 2012, the addition of a heavy rye cover crop reduced Palmer amaranth populations at harvest 70 to 95% and increased yields 16 to 23%, when all other variables, including herbicide program, were held constant. In addition to improving Palmer amaranth control and increasing yields, the rye cover crop system also has the potential to reduce herbicide input overtime, prevent or at least delay additional herbicide resistance, reduce labor needs compared to conventional tillage, mitigate wind and water erosion, improve moisture conservation, and likely reduce impact from other pests such as thrips, ryegrass, and horseweed. Although numerous benefits from this system exist, there are challenges that must be addressed including: finding time to get the rye

cover established, increased nitrogen requirements, purchasing or building a roller, and obtaining a uniform cotton stand. Large-acreage on farm studies will be used to determine the overall economics of the heavy rye system and these results should be available by winter of 2013/2014.