ROUNDUP READY WEED MANAGEMENT PROGRAMS BECOMING MORE SUSTAINABLE IN GEORGIA COTTON

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Abstract

Georgia cotton producers continue the fight against glyphosate-resistant Palmer amaranth. 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 Roundup, have risen sharply; although the residual herbicides (Warrant, Direx, Valor, Reflex, Prowl, Dual Magnum, Treflan) and Liberty use has increased the most. Although growers spend about $68/A on herbicides, control is still not adequate. Therefore, over ninety percent of Georgia cotton growers hand weeded at least 50% of the crop each of the past three seasons. 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 15 to 32% of the cotton acreage. Current management programs are diverse, complex, and expensive. However, these programs 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 per acre 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 management programs are more effective than in previous years, they are not economically sustainable and are also 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 of rye is obtained and the rye is rolled at maturity, Palmer amaranth emergence can be reduced 65 to 95%. Although the rye cover does not provide sufficient control when used alone, a rolled rye cover of at least 6000 lb/A dry matter used in conjunction with a sound herbicide program has proven extremely effective. A large (4-8 A) on-farm experiment was conducted during 2012 in Macon, Berrien, and Colquitt Counties evaluating the benefits of strip-tilling cotton into a rolled rye cover crop as compared to strip-tilling cotton into winter weeds. All programs used a standard herbicide program including Gramoxone + Valor at burndown, Reflex + Direx + Gramoxone PRE, Roundup + Warrant POST 1, Roundup + Dual Magnum POST 2, and Direx + MSMA at layby. In Macon and Berrien County, conditions were extremely dry through bloom and the number of Palmer amaranth at harvest were only 25 and 210 plants per acre with a rolled rye cover, and 500 and 678 plants per acre with winter weeds, respectfully. In the no-herbicide winter weed cover control, Palmer amaranth populations of 750,000 and 44,000 were counted at Macon and Berrien, respectfully. At both these sites, cotton yield was 16 to 23% higher when using rolled rye. In Colquitt County, irrigation was used and less than 4 Palmer amaranth plants per acre were present at harvest with similar yields obtained with each system.

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, challenges also exist and must be addressed including: finding time to plant the rye cover in a timely fashion to achieve acceptable biomass levels, increased nitrogen requirements for the rye cover and cotton crop, purchasing or building a roller, and obtaining a uniform cotton stand in heavy crop residue. Large-acreage on-farm studies will be used to determine the overall economics of the heavy-rye biomass system during 2013/2014.