MANAGEMENT OF PALMER AMARANTH IN COTTON USING COVER CROPS AND HERBICIDES Matthew S. Wiggins Lawrence E. Steckel University of Tennessee Jackson, TN

Abstract

Glyphosate-resistant (GR) weeds continue to be the most problematic weeds to control in most cropping systems in the Mid-South region of the United States. There are now no less than ten GR weed species in the Mid-South and no less than six confirmed species GR species in Tennessee. Of these, Palmer amaranth (Amaranthus palmeri S. Wats) is the most difficult of to control. Successful management schemes for controlling GR weeds include the use of PRE-emergence (PRE) herbicides, overlaying residual chemistries, making timely applications of POSTemergence (POST) herbicides and integrating cultural control methods. Unfortunately, rainfall to activate PRE's and residual herbicides can be sporadic at best in Tennessee. Therefore, timely applications of POST herbicides are essential for many producers to grow a profitable crop. This heavy reliance on POST herbicide applications increases selection pressure and the possibility of herbicide resistance. Integrating cultural control methods, such as cover crops, is a viable option available for area producers to reduce selection pressure and gain early season weed control. Unfortunately, research on integrating herbicides with a cover crop system is limited. Therefore, this trial was conducted to evaluate the effectiveness of integrating high residue cover crops in to a glyphosate and glufosinate based weed control system in cotton. A study was conducted during the 2013 growing season to investigate Palmer amaranth control in a no-till cotton system where treatments of cover crops and POST herbicides applications were applied. The cover crops evaluated were crimson clover (Trifolium incarnatum L.), hairy vetch (Vicia vilosa L.), winter wheat (Triticum aestivum), and cereal rye (Secale cereal L.). Seeding rates were 15 lbs acre⁻¹, 20 lbs acre⁻¹, 60 lbs acre⁻¹, and 60 lbs acre⁻¹ of viable seed for crimson clover, hairy vetch, winter wheat and cereal rye, respectively. Cover crops were established in the autumn of the previous year using a no-till drill and were terminated approximately three weeks prior to estimated cotton planting date. Prior to chemical termination of cover crops, biomass yields were obtained by clipping a 0.1 m^2 quadrat above the ground. The POST herbicide applications were applied when Palmer amaranth reached a height of 4-6 inches, which was approximately 15 days after cotton planting date. Herbicide treatments included glufosinate (29 oz acre⁻¹), glyphosate (32 oz acre⁻¹), and an untreated control. A sequential herbicide application was made 14 DAA, as this is a common production practice to control larger Palmer amaranth. Weed control was assessed starting 7days after application (DAA) and continued until 28 DAA. Weed density and cotton yield data were also assessed in this trial. Experimental design was a randomized complete block design with four replications and a factorial arrangement of treatments. Factors evaluated were cover crop specie and herbicide treatment. Means were separated using Fisher's Protected LSD at P ≤ 0.05 . Results indicate that winter wheat, cereal rye, and hairy vetch accumulated the greatest amount of biomass, which directly added to early season weed control. Palmer amaranth control was increased throughout the assessment periods when integrating cover crops and POST herbicides, when compared to the untreated control. Cover crop specie also had an effect on cotton yield. However, there were no differences among treatments when assessing weed densities. In summary, these results indicate that using high residue cover crops can offer some benefits in a no-till cotton system, including effective early season weed control of Palmer amaranth. However, timely applications of POST herbicides are essential for the season long control of this prolific pest.