EVALUATION OF PROGRAMS FOR THE MANGAGEMENT OF PALMER AMARANTH AND COMMON WATERHEMP IN CONVENTIONAL, GLYPHOSATE-RESISTANT, AND GLUFOSINATE-RESISTANT SOYBEANS. Kristin K. Payne*, Eric B. Riley, Travis R. Legleiter, Jim D. Wait, and Kevin W. Bradley, Graduate Research Assistant, Research Specialist, Senior Research Specialist, Research Associate, Associate Professor, Division of Plant Sciences, University of Missouri, Columbia, MO 65211.

Separate field experiments were conducted in central and southeast Missouri during 2009 to evaluate the effect of preemergence (PRE) and postemergence (POST) herbicide programs on palmer amaranth (*Amaranthus palmeri* S. Wats.) and common waterhemp (*Amaranthus rudis* Sauer) control in conventional, glyphosate-resistant, and glufosinate-resistant soybean (*Glycine max*) production systems. At both sites, Schillinger 388TC, Asgrow AG3803 glyphosate-resistant, and MBS Genetics ML3963N glufosinate-resistant soybeans were planted at approximately 370,000 seed/ha. Palmer amaranth was the predominant species at the southeastern research location while common waterhemp was the predominant species at the central research location. Treatments included PRE-only, PRE fb POST, 2-pass POST, 1-pass POST with residual, and 1-pass POST herbicide programs relevant to the respective transgenic or non-transgenic soybean system. Results from visual control evaluations ten weeks after emergence (WAE) at the central location revealed that all PRE-only and PRE fb POST applications provided greater than 97% common waterhemp control in either soybean system, while the 2-pass POST programs provided 76 to 92% common waterhemp control, and the 1-pass POST and 1-pass POST with residual programs were more variable and provided only 53 to 78% common waterhemp control. At the southeast research location, all PRE-only applications provided greater than 84% palmer amaranth control across soybean systems, while PRE fb POST applications provided from 63 to 89% palmer amaranth control, and 1-pass POST, 2-pass POST, or 1-pass POST with residual programs were extremely variable. Palmer amaranth control with POST programs in conventional soybeans ranged from 9 to 23% while 2-pass POST programs in glyphosate and glufosinate-resistant soybeans provided 89 to 98% control. The 1-pass POST program in glyphosate-resistant soybeans provided 67% palmer amaranth control but control was increased to 95% with the 1-pass POST with residual program. In glufosinate-resistant soybeans, the 1-pass POST with residual program did not increase palmer amaranth control compared to the 1-pass POST program. These results suggest that palmer amaranth is a much more difficult species to control than common waterhemp, regardless of the soybean system or herbicide program. Averaged across all herbicide programs at the central and southeast research locations, glufosinate-resistant soybeans provided the highest grain yields (4205 kg/ha central, 2801 kg/ha southeast) followed by the glyphosate-resistant soybean system (3795 kg/ha central, 2615 southeast) and the conventional soybean system (3227 kg/ha central, 1845 kg/ha southeast). Collectively, the results from both trials indicate that programs containing PRE herbicide treatments provide the best opportunity for season-long control of common waterhemp and palmer amaranth and optimum grain yields in conventional, glyphosate-resistant, or glufosinate-resistant soybean systems.

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