

INTEGRATING COVER CROP RESIDUE AND MOLDBOARD PLOWING INTO GLYPHOSATE-RESISTANT PALMER AMARANTH MANAGEMENT PROGRAMS

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Abstract

A grower's ability to manage glyphosate-resistant Palmer amaranth is directly related to the population that emerges in that area. Management tactics that can reduce the emergence of Palmer amaranth may improve one's ability to economically control this troublesome pest.

An experiment was conducted in Macon County, GA to determine the effect of moldboard plowing (soil inversion), rye cover crop residue, and moldboard plowing plus rye cover crop residue on Palmer amaranth control in Roundup- or Ignite-based herbicide programs (Table 1). Moldboard plowing and planting of the rye cover crop (75 lb/A) occurred during the previous fall (November). In April, the rye cover crop and weeds in the no cover crop systems were controlled with Roundup WeatherMax. In systems including rye, the rye residue was rolled followed by a strip-tillage implement followed by planting. In systems without rye, the strip-tillage implement was followed by planting. Plot sizes were four rows by 50 feet with four replications and an activating rainfall occurred within 5 days of each residual herbicide application. At 16 d after planting (DAP), Palmer amaranth emergence in the control (no moldboard plowing, residue, or herbicides) was 620 plant/m².

Table 1. Four herbicide options.

Treatment 1	No herbicides
Treatment 2 (DP 0949 B2RF)	Roundup WeatherMax (22 oz/A) applied topically to 1-, 5-, and 15-leaf cotton
Treatment 3 (DP 0949 B2 F)	Staple (1.7 oz/A) plus Direx (2 pt/A) plus Reflex (1 pt/A) preemergence Roundup WeatherMax (22 oz/A) plus Parrlay (21 oz/A) topically to 5-leaf cotton Direx (2 pt/A) plus MSMA (2.5 pt/A) directed to 13-leaf cotton
Treatment 4 (PHY 485 WRF)	Staple (1.7 oz/A) plus Direx (2 pt/A) plus Reflex (1 pt/A) preemergence Ignite (29 oz/A) plus Parrlay (21 oz/A) topically to 5-leaf cotton Direx (2 pt/A) plus MSMA (2.5 pt/A) directed to 13-leaf cotton

The moldboard plow was used to invert the soil to a depth of 12 inches. At 16 DAP, Palmer amaranth emergence was reduced 46 to 47% in the drill and row middles when compared to the control. At this same time, rye residue reduced Palmer amaranth emergence 50% in the drill and 94% in the row middles when compared to the control.

The system implementing both moldboard plowing plus rye cover crop residue was more effective than systems with either moldboard plowing or rye cover crop residue alone in the cotton drill, with a 65% reduction in Palmer amaranth emergence at 16 DAP. Palmer emergence was also reduced 96% in the row middles.

Three applications of glyphosate provided no control of Palmer amaranth at harvest. The Roundup-based program without tillage or cover crops controlled Palmer amaranth 63% at harvest. When integrating tillage or rye cover crop residue into the system, Palmer control was improved 17 to 18%. The Roundup system integrating both deep tillage plus residue controlled Palmer amaranth 98%.

Ignite-based programs included an Ignite application to Palmer amaranth 4 inches or less in size during early season. With this timely application of Ignite coupled with rainfall to activate residual herbicides, Palmer amaranth control was at least 97% regardless of tillage or cover crop residue.