MANAGING GLYPHOSATE-RESISTANT PALMER AMARANTH WITH RESIDUAL HERBICIDES

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Abstract

A cotton producer's ability to manage glyphosate-resistant Palmer amaranth relies heavily on residual herbicides applied throughout the season. Thus, our objective was to determine the most effective herbicide that could be applied 1) preemergence, 2) postemergence over-the-top of cotton, and 3) directed at layby.

The randomized complete design experiment was conducted at one Georgia (GA) and North Carolina (NC) location during both 2006 and 2007. Treatments were arranged factorially with thirteen herbicides applied at two rates. The treatments were applied with CO_2 backpack sprayers calibrated to deliver 15 GPA. Herbicides at a 1X and 1.5X rate were applied preemergence prior to Palmer amaranth emergence. Herbicides and their 1X rates were as follows: Caparol (1 lb ai/A), Cotoran (1 lb ai/A), Direx (1 lb ai/A), Dual Magnum (0.95 lb ai/A), Envoke (0.0047 lb ai/A), Layby Pro (1 lb ai/A), Linex (1 lb ai/A), Prowl H_20 (0.95 lb ai/A), Reflex (0.25 lb ai/A), Stalwart (1 lb ai/A), Suprend (0.8 lb ai/A prometryn + 0.007 lb ai/A trifloxysulfuron), and Valor (0.048 lb ai/A). In GA during 2006 and NC during 2006 and 2007, timely rainfalls activated residual herbicides within 5 days of treatment. In GA during 2007, rainfall did not occur until 17 days after treatment. Thus data from locations receiving timely rains are combined while data from the GA 2007 location are reported separately.

Both herbicide rate and herbicide treatment main effects were significant. Averaged over herbicides at 17 to 21 days after treatment (DAT), the 1.5X rate provided 81% control when timely rainfalls occurred. Without timely rains, control with the 1.5X rate provided only 65% control. The 1.5X rate was 7% more effective with timely rains and 12% more effective without timely rains when compared to the 1X rate.

Herbicides labeled for preemergence application to cotton included Caparol, Cotoran, Direx, Prowl, Reflex and Staple. By 17 to 21 DAT, Reflex and Staple were the most effective options (88 to 92% control with timely rains, 78% control without timely rains) followed by Direx and Cotoran (72 to 74% control with timely rains, 55 to 60% control without timely rains). Prowl and Caparol were the least effective options (57 to 62% control with timely rains; 30 to 44% without timely rains).

Herbicides labeled for topical applications to cotton included Dual Magnum, Stalwart, Envoke, and Staple. By 17 to 21 DAT, Staple (92% control with timely rains, 78% control without timely rains), Dual Magnum (83% control with timely rains, 57% control without timely rains), and Envoke (80% control with timely rains, 57% control without timely rains) were more effective than Stalwart (60% with timely rains, 35% control without timely rains).
Direx, Layby Pro, Linex, Suprend, and Valor can all be directed at layby for residual Palmer amaranth control. At 17 to 21 DAT, Valor and Suprend provided 91% control when activated with timely rains. Other options were 16 to 17% less effective. In GA during 2007 when rainfall did not occur until 17 DAT, Valor was 34% more effective than Suprend and 12 to 27% more effective than other options.
Our results suggest at-planting options of Reflex or Staple, topical options of Staple or Dual Magnum, and layby directed options of Suprend or Valor are the most effective residual tools to use on Palmer amaranth. This research

also suggests that Valor, Reflex, and Staple are the most effective residual herbicides when timely rainfalls are not expected.

Palmer amaranth resistant to ALS inhibitors is relatively common across the Southeast. Staple would not be effective on ALS-resistant Palmer amaranth, and Suprend would be considerably less effective.