

# Residual Herbicides Prioritized as Critical Tool for Glyphosate-Resistant Weed Control in Cotton

RALEIGH, N.C.

Years ago, cotton growers from the Carolinas to the Delta put away their residual herbicides when glyphosate burst onto the market. But now that glyphosate resistance is a fact of life, the tried-and-true residual herbicide tools of the past once again have become critical components for successful weed management.

James Whitehead, senior development technical lead for MANA Crop Protection, in Oxford, Miss., says glyphosate-resistance has thrown a "major wrench" into many traditional and highly economical control programs for southern cotton producers.

"While most growers want to continue relying on glyphosate as part of their control success story, the new rules of engagement require alternative chemistry to win the war against herbicide-resistant weeds," he says. "When glyphosate was introduced in Roundup Ready® crops, it was as near to being a silver bullet as anything that we have seen in weed control. And even today, glyphosate remains a good value for where and when its effectiveness can be maintained. But, with the development of glyphosate-resistant weed populations, the industry knows that glyphosate can no longer be viewed as the singular weed control solution."

## Alarming numbers

The statistics on glyphosate-resistance are updated frequently, but at least 24 states have confirmed resistant weeds growing in them. Many of these states are in the Southeast and Delta cotton producing regions. Estimates are that at least 1.3 million acres in the Mid-south are infested with glyphosate-resistant pigweed, and the infestation is even larger in the Southeast.

"In the state of Georgia, we only have one or two cotton producing counties left where there's no resistance, but only because growers in that area follow stringent crop rotation guidelines," says Stanley Culpepper, Ph.D., Extension weed scientist with the University of Georgia in Tifton, Ga. "While we continue to closely watch and study counties in North Georgia to determine its depth of resistance impact, we have identified herbicide resistance in nearly every field south of Atlanta.

"Glyphosate-resistant Palmer amaranth continues to be our biggest concern," he says. "Resistance challenges with this species are what drive weed management decisions for growers in our cotton producing areas. We are less concerned about other weeds becoming resistant to glyphosate versus Palmer amaranth becoming resistant to the next active ingredient."

Culpepper also reminds growers that it is the biology of Palmer amaranth that makes this weed challenging to control. A single female plant can consistently produce one-half million seeds while the male plant efficiently distributes the resistant trait through pollen movement. Both male and female plants grow very rapidly and will eliminate cotton production when not controlled. In Georgia during 2011, after implementing aggressive herbicide programs, Culpepper says 92 percent of cotton growers hand-weeded approximately 52 percent of the total crop at an average cost of \$23.70 per acre.

## Reasons for residuals

In Southern geographies where growers are on high alert for herbicide-resistant weeds, residual herbicides have reclaimed the leading role in delivering critical solutions in mastering glyphosate-resistance success. Season-long use of residual herbicides as part of an integrated weed management strategy is endorsed by Southern university weed experts, including the Georgia weed scientist.

Growers operating from a glyphosate-based weed management system are encouraged to use pre-plant, pre-emergence, early-post emergence, late-post emergence and directed residual herbicides in their program. The advantage of this is not only for obtaining successful control of Palmer amaranth but in preventing early weed competition and delaying resistance development in other weed species.

Alongside the use of residuals is the need to alternate modes of action throughout the season to stay ahead of resistance build-up, regardless of when weeds may appear.

"Where glyphosate-resistance is likely, proven go-to pre-plant and pre-emergence residual herbicides are offering growers the right dynamic for a systematic weed control approach," says MANA's Whitehead. "The arsenal of tools to get the job done already exists to win the war against glyphosate-resistant weeds. It's about being proactive and properly utilizing the right products at the right time over the entire course of the season. And, it's not a one-shot input solution. Multiple herbicides with varying modes of action should be used according to labeled

timings with the correct use rates to get the highest value and return in end results."

Culpepper agrees with Whitehead by says many Georgia growers have been doing exactly that since 2007. "Residual herbicides are considered a regular part of our weed management program," he says. "We start out at planting and make four or five residual applications through layby, using different modes of action and hand-weeding to improve control and to help prevent additional resistance issues."

## Keeping glyphosate in the mix

As glyphosate-resistance has gained in significance over the past 10 years, Monsanto along with industry experts recognized the importance for recommending residual herbicides as part of the long-range solution. In response to that, Monsanto created the Roundup Ready PLUS™ Weed Management Solutions platform, combining university endorsed recommendations and several herbicide manufacturers, like MANA Crop Protection, to encourage growers to use specific residual herbicides in a proactive, planned approach to their weed-management protocol.

"Over the past two years, we've witnessed an increased demand for pre-emergence residual herbicides. Not just to prevent early weed competition, but to address weeds showing signs of or confirmed for glyphosate resistance," says Whitehead. "Gold-standard residual herbicides like Cotoran®, Cotton Pro® and Direx® 4L, are providing significant value in managing resistance issues in cotton and are a perfect fit for high-impact weed control systems. These products set the bar for performance and reliability which is why growers remain committed to using them, and why Monsanto has endorsed such a highly selective product set for their program.

"Plus, Roundup Ready PLUS incentivizes growers to include such residual herbicides in their program, resulting in economic efficiencies. Roundup Ready technology has been very beneficial to the agricultural industry, and anything that can be done to prolong its life should be employed. The use of residual herbicides is one of those tools."

Whitehead also notes, "Cotoran is an excellent pre-emergent herbicide choice, given its broad-spectrum control of grasses and broadleaves, while Cotton Pro can be used as a pre-emergent or post-direct to provide contact and residual control for later-germinating weeds. For growers wanting more application flexibility, they should consider Direx 4L, which provides residual while being one of the best performing tools for pigweed control."

With or without the added use of glyphosate, the MANA Crop Protection researcher says these residual herbicides offer alternative modes of action to combat herbicide resistant weeds. As an added bonus for 2012, these products qualify for Roundup Ready PLUS incentives of \$12 per gallon (\$3 per acre, per application) therefore making it easy for growers to employ the use these important management tools.

## Economics that support change

In today's economy, Whitehead calls attention to the fact that growers and consultants must constantly consider return on investment instead of input costs alone when evaluating solutions of herbicide-resistant problems.

"In some cases, use of residual herbicides may lead to increased herbicide costs, but in many cases they will make all the difference in whether or not the crop is grown successfully," he says. "In many fields that are infested with glyphosate-resistant pigweed, a cotton crop cannot be grown successfully and harvested without the use of residual herbicides."

Culpepper puts it even more succinctly: "If growers don't use residual herbicides, they don't make a crop."

In cotton production, what goes around often comes around. And in the case of glyphosate-resistance in cotton, Whitehead believes the best alternatives and solutions are not new at all, but rather are trusted, time-tested chemistries.

"MANA Crop Protection has re-established the presence and utility of its residual herbicide portfolio by bringing back into play popular brands that were used extensively across the South before the introduction of Roundup Ready technology. Residual herbicides have a renewed value which cannot be substituted or replaced as we navigate through the age of glyphosate-resistant weeds," he concludes.

For more information about Cotoran, Cotton Pro and Direx 4L herbicides, visit the MANA Crop Protection website at [www.manainc.com](http://www.manainc.com) or call 866-406-6262. For recommendations and incentives included in the Roundup Ready PLUS Weed Management platform, go to [www.roundupreadyplus.com](http://www.roundupreadyplus.com). Δ



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