

# Weed scientist calls growers to action in resistance battle

By CECIL H. YANCY JR.

**W**EEED resistance is neither a state, a regional nor a single-crop problem. It is, however, one of the most pressing problems of the day.

Weed resistance to glyphosate is a given in today's cropping systems, says Ken Smith, University of Arkansas Extension weed scientist.

"The topic of weed resistance is one of the most serious aspects we deal with today," Smith said at the 2008 Beltwide Cotton Conferences in Nashville.

First mentioned as a scientific possibility in 1956, the idea of weed resistance was met with some skepticism by both growers and academics alike. Many thought resistance to glyphosate couldn't develop, but it did, Smith said. To date, there are 315 biotypes of weeds, covering 183 species and 19 different herbicide families. Some 13 weed species worldwide are resistant to glyphosate.

In a farm economy where time is money, wholesale changes in the way growers farm have taken place in the past decade. Conservation tillage has increased by 200% since 1997. Farm size has also increased at the same time. The use of glyphosate and the Roundup Ready system has been a gift to growers in the savings of time and labor. But, like the neighbor who let you use the tractor reminds you, "It wasn't a gift; it was just a loan," Smith said.

The first weed nightmare to hit the Mid-South was marestail or horseweed, Smith said. In 2004, ragweed made the list about the same time Smith asked, "Will pigs be next?" The answer to the

## Key Points

- Weed resistance is one of the most important issues facing growers.
- Extension recommends the use of different modes of action.
- Education of growers is the key to maintaining chemical effectiveness.

question is largely rhetorical as Palmer amaranth or pigweed suspected of resistance to glyphosate has been found in Arkansas, Tennessee and the Carolinas, while the species is taking over cotton fields in Georgia.

In 2005, researchers in Arkansas identified glyphosate-resistant pigweed in the greenhouse. Tennessee researchers also found glyphosate-resistant pigweed in the greenhouse.

In the field, resistance management is the key. "The head-in-the-sand approach exposes a very vital spot," Smith said. "Resistant weeds will kick that spot."

Weed scientists in the new century have increased the frequency and focus on their message to growers, encouraging the rotation of crops, chemistry, the avoidance of weed escapes and the use of lethal rates of herbicides, Smith said.

"We have to accept the fact that resistance will occur and talk and sell resistance management," Smith said.

Don Parker of the National Cotton Council stressed the importance of the selling job by telling a story about the way his nephew explained his misbehavior in school to his father. It seems for each offense, the boy's teacher would put a mark on the blackboard



**RESISTANCE EDUCATION:** University of Arkansas Extension weed scientist Ken Smith (left) discusses weed resistance management with the NCC's Don Parker and Arkansas grower Stewart Weaver at the 2008 Beltwide Cotton Conferences. It's not a time for the head-in-the-sand approach, Smith says.

beside the boy's name. Several reports of such marks prompted the father to promise an incentive to the boy for keeping his name off the board. The father offered 50 cents if the boy went a week without getting his name on the board. At the end of the week, when the father asked his son how he'd done, the boy replied, "I saved you 50 cents."

"He put a lot of thought into how to sell his message best to benefit himself," Parker said.

Likewise, "we know weed resistance is not a single crop, a single state or a single herbicide issue," Parker said. "The NCC is trying to support educa-

tional efforts with Beltwide presentations." Also, a weed-resistance learning module developed by the NCC with help from Extension weed specialists is available online at the NCC's Web site at [www.cotton.org/tech/pest/wrm](http://www.cotton.org/tech/pest/wrm).

A survey of growers regarding weed resistance, however, did reveal that about 90% of cotton growers in Mississippi and North Carolina are aware there is a problem with resistance, Parker said. "Thirty percent of those surveyed are using glyphosate only." In the same survey, only 66% of the growers in Indiana said that weed resistance was a moderate concern.

## Living with resistance

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**W**EEED resistance came on Stewart and William Weaver like a fog rolling across the Mississippi River into Arkansas. Noticing marestail or horseweed escapes in their burndown program in 2002, the Weavers brought out the long-dormant cultivators, increased glyphosate applications and even got out the hoes — all with limited results.

"The cultivators did a good job with the middles, but in the season, you could see the horseweed out of the tops of the cotton," Stewart recalled for participants at the 2008 Beltwide Cotton Conferences in Nashville. "We even had our county agents out in the fields with hoes, but we did away with that program on the second day," he chuckled.

In 2004, University of Arkansas researchers set up trials on the Weaver farms. The marestail problem is under control with a combination of 2,4-D,



**AN EYE ON RESISTANCE:** William and Stewart Weaver were quick to "jump on" resistant marestail. They're keeping a close eye on pigweed as well.

dicamba, Dual and Valor while they wait for more resistance in the form of Palmer amaranth, better known as pigweed, to roll in.

"When we discovered we had a problem with escapes in marestail, we started going back to 2,4-D or dicamba, and something like Clarity later in the year," William said.

In the Mid-South, experts recommend mixing the use of glyphosate with

residuals to manage weed resistance, said Ken Smith, University of Arkansas Extension weed scientist.

They also recommend jumping any escapes early when the weeds are small. They point out a few escapes can lead to fieldwide problems.

Following the Extension recommendations, the Weavers did "jump on the weed resistance early," Stewart said.

"We've relied pretty heavily on

glyphosate since going to transgenic cotton," Stewart said. "It's a good product, and we don't want to lose it." Their weed control program has evolved in the past four years.

In 2004, the Weavers used 2,4-D with their glyphosate burndown, switching to dicamba when the planting window narrowed. The program included 22 ounces of Roundup and a pint of Dual about two weeks after planting; 18 ounces of Roundup and 0.1 ounce of Envoke under the hood on June 29; and a pound of Diuron and a pint of crop oil at layby.

In 2005, they applied an 8-ounce shot of dicamba and 1 pound of Diuron at preplant before planting on May 6. A 20-ounce shot of Roundup and 0.1 ounce application of Envoke came late in June under hoods. "Envoke allowed the cotton to grow while suppressing the marestail," Stewart says.

In 2006, the Weavers used 2,4-D in their burndown program, along with the basic program "of mixing the chemistry up to handle marestail," Stewart said.

In 2007, the Weavers added Valor to the Roundup burndown and Dual in early June. Their last application of Roundup came on June 22 last year.