

By Larry Reichenberger

# BLOCK A WEED INVASION

*Combining weed-control tools will prolong the life of ag's most popular herbicide*

A classic example of what happens with “too much of a good thing” is now on display in a growing number of corn and soybean fields. Lured by the ease and dependability of Roundup-Ready systems, farmers have scrambled to make glyphosate their sole herbicide. Now, weed-control experts are frantically waving caution flags in an often frustrating effort to slow this stampede.

**Building resistance.** “The widespread and repeated use of glyphosate-based herbicides has put tremendous pressure on weed species to either develop resistance or to shift from those easily controlled by the label rate of glyphosate to those more tolerant to it,” says Stevan Knezevic, weed management specialist with the University of Nebraska at Lincoln.

“As a result, glyphosate isn’t working like it did five or six years ago and farmers are responding by doing exactly the wrong thing—they’re using more glyphosate. This approach only

hastens the development of even more problems,” adds Knezevic.

Iowa State University agronomist Mike Owen sees a similar pattern. “Weed scientists have been warning of the potential evolution of herbicide resistant weeds and shifting weed populations for the past 15 years. We’ve predicted these changes with relative accuracy and have made an incredible effort to alert growers of these impending problems. However,

►**Above:** Nebraska weed scientist Stevan Knezevic says that overdependence on glyphosate threatens the use of Roundup-Ready crops.

given what has evolved in fields, it looks like those efforts were largely a waste of time,” says Owen.

Roundup herbicide was introduced in 1974, but prior to the development of glyphosate-tolerant crops in 1996 only two weed species had developed resistance to the herbicide. However, in





►**Above:** Marestail (horseweed) is an example of an invasive weed species that has made the transformation to glyphosate resistance.

recent years that picture has changed.

“World-wide, 11 weed species are now reported to have evolved glyphosate-resistant biotypes and six are in the U.S.,” Owen says. “Nine of these have developed since 2000, and four since the year 2005 alone. The evolution of glyphosate-resistant weeds is increasing at a rather rapid rate.”

A shift in weed species to those able to withstand the label rate of glyphosate is just as alarming, according to Knezevic. “In Nebraska, these ‘new’

weeds include marestail, morning-glory, wild buckwheat, Pennsylvania smartweed, waterhemp, kochia, Russian thistle, field bindweed, venice mallow, yellow sweetclover, and primrose,” Knezevic reports.

Additional weeds are making the shift to glyphosate tolerance in other areas. In Iowa, Owen adds lambsquarter and Asiatic dayflower to the list.

Knezevic says when farmers face these invasive species, their typical response is to simply increase the rate of glyphosate. “Our studies show the label rate of Roundup WeatherMax, at 22 ounces per acre, was unable to control most of these weeds over 3

inches tall. It took up to four times the label rate to achieve 90% control when weeds were taller. Sadly, growers appear willing to do that. Even at two to three times the label rate, glyphosate is still the least expensive approach. However, it’s not the best approach because it hastens the development of truly resistant species. When that happens, glyphosate is lost as a weed-control tool,” he explains.

**Mode of action.** Owen says growers need to understand the long-term benefit of a more diverse weed management program that delays the changes brought on by overuse of glyphosate. “Using a soil-applied herbicide as part of a glyphosate-resistant corn and soybean program brings in a different mode of action that reduces the selection pressure. Many farmers see this stewardship as an added expense, but that’s short-sighted.”

**A**nother way to change the mode of action to attack invasive weed species is to tank-mix glyphosate with other post-emerge herbicides. Knezevic tried this approach on the “new” weeds listed earlier by tank-mixing half-rates of seven common broadleaf post herbicides with a full rate of glyphosate. Each tank-mix was blended using appropriate additives and applied at three growth stages.

Most weeds were controlled relatively well with this approach, especially if targeted in the early growth stage (2 inches to 5 inches tall). For example, a tank-mix of Roundup and Classic provided 90% control of 4-inch-tall sweetclover compared to only 50% control when the label rate of Roundup was used alone.

“However, for most species taller weeds may require higher rates of the broadleaf herbicides, perhaps full recommended rates,” explains Knezevic.

“Using various weed-control tools like this isn’t a new idea,” Knezevic says. “We’ve only forgotten about it since the introduction of Roundup-Ready crops. Changing the modes of action in your herbicide program is one way to help preserve this cost-effective technology.” ■