

Glyphosate Stewardship



Fix it before it BREAKS

Glyphosate-resistant weeds have likely arrived in Iowa. It was inevitable — certain members of any weed population have the genetics to fight whatever strategy is used against them.

Fortunately, Iowa farmers realized the problem early. And by acting now, we can create management plans that help keep glyphosate-resistant weeds from advancing.

“Isolated fields are there, but we can still get ahead of the resistant weeds,” says Mike Owen, professor of agronomy and Extension weed science at Iowa State University.

“We need to think like this: It’s not broken, and we need to fix it so it stays that way.”

A well-designed management plan can help you keep glyphosate-resistant weeds out of your fields.

Turn the page to find out how you can keep yields up...and resistant weeds out.

Weed Populations are Changing



Lambsquarters

In Iowa, glyphosate resistant soybeans are planted on nearly 100 percent of soybean acreage. Soybean growers appreciate how glyphosate-based crop systems give consistent weed control, and little soybean injury.

Fields may receive two glyphosate applications during the growing season. That means weeds get a lot of exposure to glyphosate.

Common lambsquarters, common waterhemp and giant ragweed are most frequently identified as problems. Owen documented glyphosate resistant waterhemp in Iowa in 1999. He believes others are out there but a comprehensive survey is

needed to be sure. But globally, 14 weed species — grasses and broad-leaf weeds — have evolved resistance to glyphosate. And it looks like this trend is increasing.

A high percentage of Iowa soybean producers and ag chemical dealers believe these weeds are becoming more difficult to control with glyphosate. And, ag chemical dealers believe that it now takes higher rates of glyphosate to control them. This suggests that other resistant weed populations may be on the way.



Marestail

How to spot glyphosate resistant weeds in your fields

Ask yourself:

- *Do patterns of weed escapes exist in my fields?*
- *Is only one weed species escaping glyphosate?*
- *Near the escaped weeds, have others of the same species been controlled?*

If the answer to one or more of these questions is yes, you may have a resistant weed population.

But by the time you identify a resistant weed population, you may already have a problem. Resistant

weeds can be in a field for up to two years before they are discovered.

Meanwhile, they're spreading seed and establishing themselves more and more. They'll remain a problem for an extremely long time, owing to high seed production and seed dormancy in the soil.

That's why, as Mike Owen says, you have to fix the problem before you realize you have it. Prevent weeds from moving in...because once you have a problem, it can be managed, but never totally fixed.

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— Mike Owen



Waterhemp

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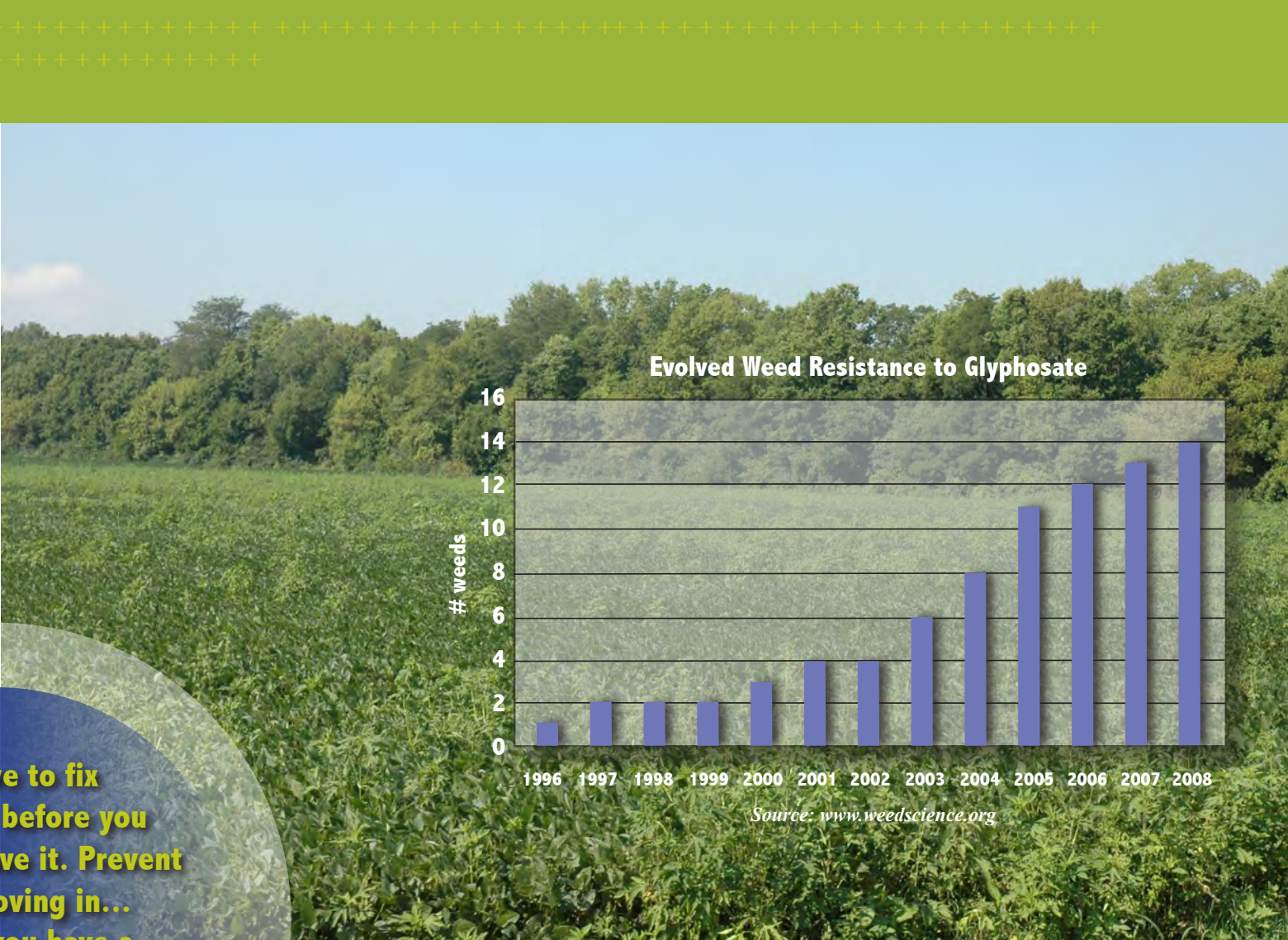
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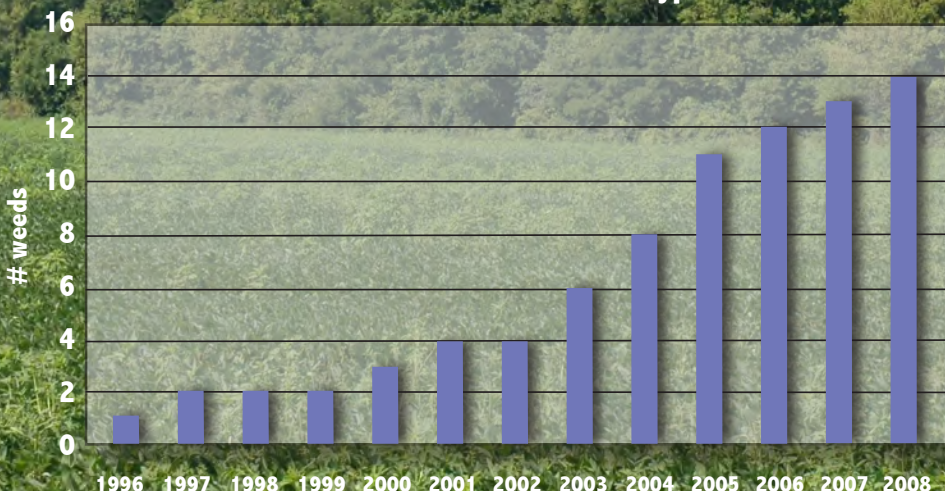
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Waterhemp



Evolved Weed Resistance to Glyphosate



Source: www.weedscience.org

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...before you
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Owen

Diversify for Better Long-Term Results

Incorporate assorted technologies and approaches into your plan

No magic bullet exists for fighting resistance. New herbicide or herbicide-resistant traits are being developed, such as resistance to dicamba herbicides, but they are not likely to be available for a number of years.

A balanced, diligent and diversified approach is the only defense. Integrated weed management tactics include:

- Use a weed management program that includes a soil applied herbicide in

addition to your glyphosate application.

- Use soybean management programs designed for producing high yields. "Aggressive" soybeans can be an effective stewardship tactic when the crop is competitive with weeds.
- Scout fields, observe and manage weed problems when they are just beginning.
- Rotate the use of Roundup Ready and Liberty Link

traits in your soybean production system.

Optimum GAT technology will be introduced in 2011 for soybeans. Optimum GAT is a new form of resistance to glyphosate stacked with resistance to ALS inhibitor herbicides.

- All fields are different. Develop individual weed management programs for each field, and keep records documenting your approach.

Remember the 3Es of Stewardship

Economics

The benefits of glyphosate stewardship will be realized first in improved profitability, by eliminating early weed competition. That means higher soybean yields. Longer term benefits of glyphosate stewardship include the delay or elimination of weeds resistant to glyphosate.

Many glyphosate applications are delayed beyond a timing that is best for the protection of soybean yields. Research has shown that early season weed competition consistently costs soybean growers more yield than any other pest.

Often, there is concern that using residual herbicides will add needless cost to soybean production.

However, consider that one-day delayed application of glyphosate may cost more than a residual herbicide. Delays of five to 10 days may result in potential losses of \$22 to \$66 per acre.

Always remember: Scout early, and scout often!

Ecology

Once resistant weeds arrive, they're there to stay. They can affect yields for many years if they have been allowed to set seed because weed seeds remain viable for many years in the soil.

Herbicides that are applied frequently impart intense selection pressure on the weed community. Weeds that are not effectively controlled will become the dominant weeds in the field.

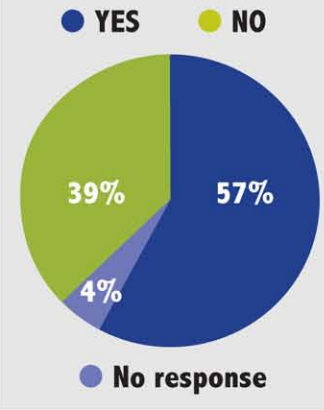
Environment

Mix pre-emergent programs with post-emergent programs. Even though glyphosate can control most weeds irrespective of size, any program that relies on one chemistry only, such as glyphosate, can promote weed resistance. Glyphosate stewardship also includes consideration of application timing, to minimize drift.

Resprays are repetitive uses of the same tactics. These can invoke more selection among the weed community, and there is the potential for late sprays to be environmentally damaging.

Glyphosate Rates

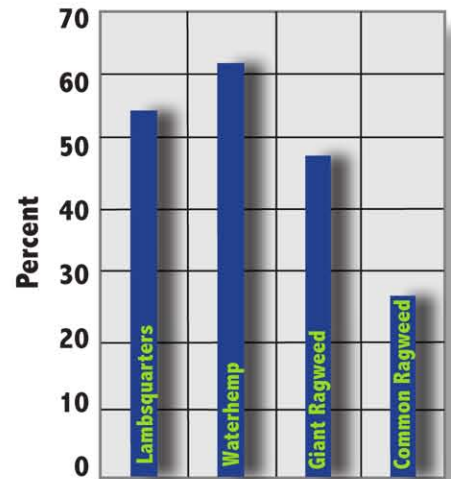
Are higher rate or application frequency of glyphosate now required for weed control?*



* Survey of 568 Iowa ag chemical dealers

Weed Control

Percent of ag chem dealers who believe the ability to control weeds with glyphosate has declined.



Source: Iowa State University

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