

# Addressing the Growing Glyphosate Resistance Problem

Although glyphosate has long been used to control unwanted weeds in general, and grassy weeds in specific, some of that control has waned as grasses develop resistance to the herbicide. This spreading resistance is prompting the use of herbicides with different modes of action.

## 1 Is glyphosate resistance spreading?

Yes. Rigid ryegrass was initially reported as being resistant to glyphosate in 1998.<sup>1</sup> Today, more than 360 weed species have been identified with reduced effectiveness for glyphosate globally, half of them in the U.S.<sup>2</sup> This includes several types of grassy weeds including annual bluegrass, goosegrass, barnyard grass, Johnsongrass, jungle rice and annual ryegrass.

## 2 How can glyphosate-resistant grass be controlled and why is it important?

Weeds have always been a challenge for farmers, as they steal water and nutrients from growing crops. The competition they create can also damage yields — even grasses with minimal density like giant foxtail can reduce corn yields by 13%-14%.<sup>3</sup>

A range of control options can be used to address resistant weeds, including applying herbicides with multiple or different modes of action, rotating crops and using mechanical control practices. Scouting and keeping records of past herbicide applications can also be helpful. However, caution is needed because some herbicides that are used to kill unwanted grasses can also damage corn.

For example, FOP herbicides were not traditionally used to control glyphosate-resistant grasses in corn fields because conventional corn is susceptible to the herbicide. But new corn hybrids with tolerance to FOP herbicides — like PowerCore® Enlist® corn — are now available. In a field trial, FOP application provided 97%-99% control of glyphosate/glufosinate-resistant weeds but had no negative effect on corn with the Enlist® trait.<sup>4</sup>

## 3 Is corn with the Enlist® trait the only technology with FOP tolerance?

Yes. PowerCore Enlist corn is tolerant to 2,4-D choline in Enlist® herbicides, glyphosate, glufosinate and FOP herbicides. This specific group of tolerances is not available from any other technology on the market.

FOP-family herbicides have a group one site of action, are lipid synthesis inhibitors and include quizalofop, fluazifop and diclofop.<sup>5</sup> Tolerance to FOP herbicides is important because they can be used to address unwanted, glyphosate-tolerant grasses, providing another tool and an additional mode of action for farmers.

<sup>1</sup> Boerboom, Chris, and Michael Owen. "Facts about glyphosate-resistant weeds." Glyphosate, Weeds, and Crops Series. Purdue University Extension. December 2006.

<sup>2</sup> Nickel, Rod, and Tom Polansek. "Crop-killing weeds advance across us farmland as chemicals lose effectiveness." January 16, 2024. <https://www.reuters.com/markets/commodities/crop-killing-weeds-advance-across-us-farmland-chemicals-lose-effectiveness-2024-01-16/>.

<sup>3</sup> "Michigan's Worst Weeds: Giant Foxtail." Michigan State University Extension. Accessed February 26, 2024. <https://www.canr.msu.edu/weeds/extension/giant-foxtail>.

<sup>4</sup> Striegel, Adam, Nevin Lawrence, Stevan Knezevic, Jeffrey Krumm, Gary Hein, and Amit Jhala. "Control of glyphosate/glufosinate-resistant volunteer corn in corn resistant to aryloxyphenoxypropionates." Weed Technology 34:3 (2020): 309-317. doi:10.1017/wet.2020.41.

<sup>5</sup> "Corn and Soybean Herbicide Chart." Glyphosate, Weeds, and Crops Series. University of Wisconsin Extension. January 2013.



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sales professional for information and suggestions specific to your operation. Individual results may vary. Various factors, including pest pressure, reduced susceptibility and insect resistance in some pest populations may affect efficacy of certain corn technology products in some regions. To help extend durability of these technologies, Corteva Agriscience recommends you implement integrated pest management (IPM) practices such as crop rotation, cultural and biological control tactics (including rotating sources of Bt-protected corn traits), pest scouting and appropriate use of pest thresholds when employing management practices such as insecticide application. You must also plant the required refuge when using these technologies. Please contact your sales professional or consult with your local university extension for more information regarding insect resistance management guidelines, best management practices and to understand whether there has been a shift in susceptibility or insect resistance with certain pests documented in your area. Liberty®, LibertyLink® and the Water Droplet Design are registered trademarks of BASF. ®Roundup and Roundup Ready are registered trademarks of Bayer Group. Always read and follow label directions.

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