

# HERBICIDE RESISTANCE TRAITS: Quick Reference Guide

Herbicide-resistant crops have provided more flexibility for postemergence (POST) herbicide applications across cropping systems. Today, there are more options than ever before for herbicide-resistant traited technology leading to an abundant number of potential POST tank-mixture combinations. However, this abundance of options has led to confusion of which herbicides certain traits confer resistance to and has increased the potential for misapplications to occur.

This quick reference guide was established to provide a direct resource to quickly identify what herbicides each herbicide-resistant trait provides resistance to. Herbicide resistance traits and the respective herbicides that those traits confer resistance to for corn (Table 1), cotton (Table 2), rice (Table 3) and soybean (Table 4) are represented below. A check mark and green color indicates that the herbicide paired with the specific herbicide-resistant trait would not injure the respective crop if applied in-season.

**TABLE 1. CORN HERBICIDE RESISTANCE TRAITS AND THE HERBICIDES THAT THOSE TRAITS PROVIDE RESISTANCE TO.<sup>a</sup>**

CORN HERBICIDE TRAIT	GLYPHOSATE	GLUFOSINATE	2,4-D CHOLINE <sup>b</sup>	FOP ACCase INHIBITORS
CONVENTIONAL				
GLYPHOSATE TOLERANT (GT)	✓			
LIBERTYLINK (LL)		✓		
GT LL	✓	✓		
ROUNDUP READY 2 YIELD (RR2Y)	✓			
RR2Y LL	✓	✓		
ENLIST	✓		✓	✓

<sup>a</sup>Trait names in corn (Agrisure, Optimum, Yieldgard, Smartstax, etc.) often refer to the insect management traits. To identify the herbicide resistance trait within these products, please consult the product information provided by the company for more specifics.

<sup>b</sup>Only approved 2,4-D choline formulations (Enlist Duo, Enlist One) are permitted to be applied over-the-top of Enlist corn.

**TABLE 2. COTTON HERBICIDE RESISTANCE TRAITS AND THE HERBICIDES THAT THOSE TRAITS PROVIDE RESISTANCE TO.**

COTTON HERBICIDE TRAIT	GLYPHOSATE	GLUFOSINATE	2,4-D CHOLINE <sup>a</sup>	DICAMBA <sup>b</sup>
CONVENTIONAL				
GLYTOL	✓			
GLYTOL-LIBERTYLINK	✓	✓		
ROUNDUP READY FLEX	✓			
ROUNDUP READY XTENDFLEX	✓	✓		✓
ENLIST	✓	✓	✓	

<sup>a</sup>Only approved 2,4-D choline formulations (Enlist Duo, Enlist One) are permitted to be applied over-the-top of Enlist cotton.

<sup>b</sup>Only approved dicamba formulations (Engenia, FeXapan, Tavium and XtendiMax) are permitted to be applied over-the-top of XtendFlex cotton.

**TABLE 3. RICE HERBICIDE RESISTANCE TRAITS AND THE HERBICIDES THAT THOSE TRAITS PROVIDE RESISTANCE TO.<sup>a</sup>**

RICE HERBICIDE TRAIT	ALS INHIBITORS - IMI HERBICIDES <sup>b</sup>	FOP ACCase INHIBITORS <sup>c</sup>
CONVENTIONAL		
CLEARFIELD	✓	
FULLPAGE	✓	
PROVISIA		✓

<sup>a</sup>All rice with these three herbicide resistance traits are non-GMO.

<sup>b</sup>Only resistant to imazethapyr and imazapic; Clearfield = Newpath and Beyond, FullPage = Preface and Postscript.

<sup>c</sup>Resistance trait in rice was specifically developed for quizalofop (Provisia) herbicide. Cyhalofop (Clincher) is also safe for use in Provisia rice.

**TABLE 4. SOYBEAN HERBICIDE RESISTANCE TRAITS AND THE HERBICIDES THAT THOSE TRAITS PROVIDE RESISTANCE TO.**

SOYBEAN HERBICIDE TRAIT	GLYPHOSATE	GLUFOSINATE	2,4-D CHOLINE <sup>a</sup>	DICAMBA <sup>b</sup>	HPPD INHIBITORS <sup>c</sup>	ALS INHIBITORS
CONVENTIONAL						
STS/BOLT <sup>d</sup>						✓
LIBERTYLINK		✓				
ROUNDUP READY	✓					
ROUNDUP READY 2 YIELD	✓					
ROUNDUP READY 2 YIELD XTEND	✓			✓		
ROUNDUP READY 2 YIELD XTENDFLEX <sup>e</sup>	✓	✓		✓		
ENLIST E3	✓	✓	✓			
GT27	✓				✓	
LLGT27	✓	✓			✓	
MGI <sup>e</sup>		✓			✓	

<sup>a</sup>Only approved 2,4-D choline formulations (Enlist Duo, Enlist One) are permitted to be applied over-the-top of Enlist E3 soybean.

<sup>b</sup>Only approved dicamba formulations (Engenia, FeXapan, Tavium, XtendiMax) are permitted to be applied over-the-top of Xtend and XtendFlex soybean.

<sup>c</sup>GT27 and LLGT27 are resistant to isoxaflutole preemergence. MGI are resistant to isoxaflutole preemergence and mesotrione (Callisto) postemergence. No HPPD-inhibiting herbicide is approved for use in soybean in the United States as of April 2019.

<sup>d</sup>Varieties with other herbicide traits listed may also contain the STS/BOLT trait, please consult the variety information provided by the seed company for more specifics.

<sup>e</sup>Not approved for commercial production in the United States as of April 2019.

Thomas R. Butts is an assistant professor, extension weed scientist. L. Tom Barber is a professor, extension weed scientist. Butts and Barber are located in Lonoke. Jarrod T. Hardke is an associate professor, rice extension agronomist located in Stuttgart. Jason P. Kelley is a professor, wheat and feed grains extension agronomist located in Little Rock. William C. Roberts is a professor, cotton extension agronomist located in Newport. W. Jeremy Ross is a professor, soybean extension agronomist located in Lonoke. All are with the Department of Crop, Soil, and Environmental Sciences, University of Arkansas System Division of Agriculture.

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