QUICK START GUIDE

HOW TO USE THE HERBICIDE CLASSIFICATION CHART

The Herbicide Classification Chart is your most important tool for taking action against your worst weeds. By knowing herbicide groups by their site of action (SOA), you can diversify your herbicide applications to reduce your risk of herbicide resistance.



The left half of the chart classifies herbicides by their mode of action (MOA).

For example, Groups 2 and 9 are both Amino Acid Synthesis Inhibitors, which means their MOA is to shut down amino acid production necessary for protein synthesis.

But Groups 2 and 9 are also broken into their SOA.
Group 2 are ALS inhibitors, which inhibits the enzyme acetolactate synthase (ALS) as their SOA, while Group 9 includes glyphosate, which inhibits the chloroplast enolpyruvyl shikimate-3-phosphate synthase (EPSPS) as the SOA

The right half of the chart lists specific herbicides or premixes by their sites of action (SOA).

Premixes on this chart are listed by the most common brand names. If you use a generic brand, you will need to look up the common brand equivalent or the active ingredients.

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Let's Get Started:

Use the chart to outline your site of action (SOA) rotation.

Find the products you use on the chart, then write down each SOA group number.

What you're looking for:

- The group number of sites of action used
- The number of effective sites of action used
- Selection pressure placed on a site of action (used more than two times)

Your goal is to have more than one effective mode of action on your worst weeds.

EXAMPLE 1:

In this example, our biggest problem weed is common waterhemp. Common waterhemp has known resistance to ALS inhibitors (Group 2) and glyphosate (Group 9).

Waterhemp (ALS + glyphosate resistant)

TIMING	HERBICIDE	ACTIVE INGREDIENT(S)	SOA GROUP(S)
EARLY POST	Extreme	imazethapyr	2
		glyphosate	9
LATE POST	Flexstar GT	fomesafen	14
		glyphosate	9

Let's say we're using a program of Extreme early post and Flexstar GT late post.

Using the premix side of the chart, we would find that Extreme uses the active ingredients of imazethapyr (Group 2) and glyphosate (Group 9), while Flexstar GT has fomesafen (Group 14) and glyphosate (Group 9). So we're using a Group 9 twice.

Waterhemp (ALS + glyphosate resistant)

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TIMING	HERBICIDE	ACTIVE INGREDIENT(S)	SOA GROUP(S)
EARLY POST	Extreme	imazethapyr	2
		glyphosate	9
LATE POST	Flexstar GT	fomesafen	14
		glyphosate	9

	chlorimuron	Classic	2
ENVIVE	thifensulfuron	Harmony	2
	flumioxazin	Valor	4
	s-metolachlor	Dual Magnum	(15)
EXPERT	atrazine	AAtrex	5
	EXAMPLE 1	llyphosate	9
EXTREME	imazethapyr	Pursuit	2
EXIKEME	glyphosate	glyphosate	9
	acetochlor	Harness	(15)
FIELD MASTER	atrazine	AAtrex	5
	glyphosate	glyphosate	9
FIERCE	flumioxazin	Valor	14
FIERCE	pyroxasulfone	Zidua	15
	flumioxazin	Valor	14
FIERCE XLT	pyroxasulfone	Zidua	(15)
	chlorimuron	Classic	2
EU.E00E	chlorsulfuron	Glean	2
FINESSE	metsulfuron	Ally	2
FINESSE GRASS	chlorsulfuron	Glean	2
AND BROADLEAF	EXAMPLE 1	verest	(2)
ELEVATID OT	fomesafen	Flexstar	14
FLEXSTAR GT	glyphosate	glyphosate	9
FOXFIRE	fenoxaprop	Тесота	1
FUXFIKE	pinoxaden	Axial XL	1
FULTIME NXT	acetochlor	TopNotch	15
FULTIME NXT	atrazine	AAtrex	5
FUCION	fluazifop	Fusilade DX	1
FUSION	fenoxaprop	Puma	
OANOCTED	flumioxazin	Valor	14
GANGSTER	cloransulam	FirstRate	

However, if we look at effective sites of action (SOAs with no known resistance), we are actually only using one effective site of action: Group 14. This would be cause for concern as selection pressure is being placed on Group 14. In this case, an adjustment of the program would be needed to include additional effective sites of action and reduce the selection pressure on Group 14.

It is recommended to go through this same exercise with each resistant weed you have.

EXAMPLE 2:

In our second example, our biggest problem weed is Palmer amaranth with known resistances to ALS inhibitors (Group 2) and glyphosate (Group 9).

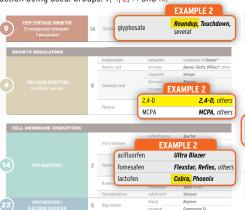
Our current program for Palmer amaranth consists of Roundup, 2,4-D and Envive for burndown; Prefix for early post; and Cobra for late post.

Using the left side of the chart, we find Roundup is a glyphosate (Group 9) and 2,4-D is a Group 4. Using the right side, we see Envive is a premix with chlorimuron (Group 2), thifensulfuron (Group 2) and flumioxazin (Group 14). Prefix is a premix with s-metolachlor (Group 15) and fomesafen (Group 14). And Cobra is a lactofen (Group 14).

Palmer Amaranth (ALS + glyphosate resistant)

TIMING	HERBICIDE	ACTIVE INGREDIENT(S)	SOA GROUP(S)
BURNDOWN	Roundup	glyphosate	9
	2,4-D	2,4-D	4
		chlorimuron	2
	Envive	thifensulfuron	2
		flumioxazin	14
EARLY POST	- <i></i>	s-metolachlor	15
	Prefix	fomesafen	14
LATE POST	Cobra	lactofen	14

So in this program we can see that there are five sites of action being used: Groups: 9, 4, 2, 14 and 15.

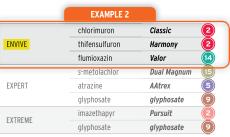


Palmer Amaranth (ALS + glyphosate resistant)

TIMING	HERBICIDE	ACTIVE INGREDIENT(S)	SOA GROUP(S)
BURNDOWN	Roundup	glyphosate	9
	2,4-D	2,4-D	4
	Envive	chlorimuron	2
		thifensulfuron	2
		flumioxazin	14
EARLY POST	- <i></i>	s-metolachlor	15
	Prefix	fomesafen	14
LATE POST	Cobra	lactofen	14

When considering effective sites of action (SOAs with no known resistance), that number decreases to three sites of action: Groups 4, 14 and 15. This is a better program than example 1 as it includes multiple sites of action, rather than just one. A concern with this program would be that Group 14's are used three times within the season.

As mentioned in example 1, it is recommended go through this same exercise with each resistant weed in your fields.



PERMIT PLUS	thifensulfuron EXAMPLE 2	Harmony mit	2
DEELV	s-metolachlor	Dual Magnum	(5
PREFIX	fomesafen	Reflex	14
DEOLIEI	rimsulfuron	Resolve	2
PREQUEL	isoxaflutole	Balance	2
PRIORITY	carfentrazone	Aim	14
	halosulfuron	Permit	2



For more information and links to additional resources, visit www.TakeActionOnWeeds.com.

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Technical editing for this guide was led by Bill Johnson, Ph.D., Purdue University and Christy Sprague, Ph.D., Michigan State University, in partnership with other universities in the soybean-growing regions of the United States.

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