HERBICIDE CLASSIFICATION

Repeated use of herbicides with the same site of action can result in the development of herbicide-resistant weed populations.

Take ACTION
Herbicide-Resistance Management

by MODE OF ACTION (MOA) *[effect on plant growth]*

This chart groups herbicides by their modes of action to assist you in selecting herbicides **1)** to maintain greater diversity in herbicide use and **2)** to rotate among effective herbicides with different sites of action to delay the development of herbicide resistance.

SITE-OF-ACTION GROUP	SITE OF ACTION	NUMBER OF RESISTANT WEED SPECIES IN U.S.	CHEMICAL FAMILY	ACTIVE INGREDIENT	PRODUCT EXAMPLES (TRADE NAME)
LIPID SYNTHESIS INHIBITORS					
1	ACCASE INHIBITORS (acetyl CoA carboxylase)	15	Aryloxyphenoxypropionate (fops)	clodinafop	*Discover NG*
				cyhalofop	*Clincher*
				fenoxaprop	*Ricestar HT, others*
				fluazifop	*Fusilade DX*
				quizalofop	*Aggressor, Assure II, Targa*
			Cyclohexanedione (dims)	clethodim	*Select Max, others*
				sethoxydim	*Poast, Poast Plus*
			Phenylpyrazolin	pinoxaden	*Axial XL*
AMINO ACID SYNTHESIS INHIBITORS					
2	ALS INHIBITORS (acetolactate synthase)	49	Imidazolinone	imazamox	*Raptor, Beyond, Clearmax*
				imazapic	*Plateau*
				imazapyr	*Arsenal*
				imazaquin	*Scepter*
				imazethapyr	*Pursuit, Newpath*
			Pyrimidinylthiobenzoic acid	bispyribac	*Regiment*
				pyrithiobac	*Staple*
			Sulfonylaminocarbonyltriazolinones	flucarbazone	*Everest, Pre-Pare, Sierra*
				propoxycarbazone	*Olympus*
				thiencarbazone	*Varro*
			Sulfonylurea	bensulfuron	*Londax*
				chlorimuron	*Classic*
				chlorsulfuron	*Glean*
				halosulfuron	*Permit, Sandea*
				iodosulfuron	*Autumn*
				mesosulfuron	*Osprey*
				metsulfuron	*Ally*
				nicosulfuron	*Accent Q, Zest*
				orthosulfamuron	*Strada*
				primisulfuron	*Beacon*
				prosulfuron	*Peak*
				rimsulfuron	*Matrix, Resolve*
				sulfosulfuron	*Maverick*
				thifensulfuron	*Harmony*
				triasulfuron	*Amber*
				tribenuron	*Express*
				trifloxysulfuron	*Envoke*
				trifusulfuron	*Upbeet*
			Triazolopyrimidine	cloransulam	*FirstRate*
				florasulam	*component of Orion*
				flumetsulam	*Python, Accolade*
				penoxsulam	*Grasp*
				pyroxsulam	*PowerFlex HL*
9	EPSP SYNTHASE INHIBITOR (5-enolpyruvyl-shikimate-3-phosphate)	17	Organophosphorus	glyphosate	*Roundup, several others*
GROWTH REGULATORS					
4	SYNTHETIC AUXINS (TIR1, AFB5 and unknown auxin receptors)	8	Arylpicolinate	halauxifen	*Elevore*
			Benzoic acid	dicamba	*Banvel, Clarity, DiFlexx, Engenia, FeXapan, XtendiMax, others*
			Carboxylic acid	aminopyralid	*Milestone*
				clopyralid	*Stinger*
				fluroxypyr	*Starane Ultra*
				quinclorac	*Facet*
				triclopyr	*Garlon, Remedy Ultra*
			Phenoxy	2,4-D	*2,4-D, Enlist One, others*
				MCPA	*MCPA, others*
19	AUXIN TRANSPORT INHIBITOR	0	Semicarbazone	diflufenzopyr	*component of Status*
PHOTOSYNTHESIS INHIBITORS					
5	PHOTOSYSTEM II INHIBITORS (different binding than 6 & 7)	26	Phenylcarbamate	desmedipham	*Betenex*
				phenmedipham	*component of Betamix*
			Triazine	atrazine	*AAtrex, others*
				prometon	*Pramitol*
				prometryn	*Caparol*
				simazine	*Princep*
			Triazinone	hexazinone	*Velpar*
				metribuzin	*Metribuzin, others*
			Uracil	terbacil	*Sinbar*
6	PHOTOSYSTEM II INHIBITORS (different binding than 5 & 7)	1	Benzothiadiazole	bentazon	*Basagran, others*
			Nitrile	bromoxynil	*Maestro, Moxy, others*
			Pyridazine	pyridate	*Tough*
7	PHOTOSYSTEM II INHIBITORS (different binding than 5 & 6)	9	Amide	propanil	*SuperWham*
			Urea	diuron	*Direx, Karmex*
				fluometuron	*Cotoran*
				linuron	*Lorox, Linex*
				tebuthiuron	*Spike*
NITROGEN METABOLISM INHIBITOR					
10	GLUTAMINE SYNTHETASE INHIBITOR	1	Organophosphorus	glufosinate	*Liberty, Rely, Scout, others*
PIGMENT INHIBITORS					
12	PHYTOENE DESATURASE (PDS) INHIBITOR	1	none recognized	fluridone	*Sonar*
			Pyridazinone	norflurazon	*Solicam*
13	DOXP SYNTHASE INHIBITOR (1-DEOXY-D-XYLULOSE 5-PHOSPHATE)	1	Isoxazolidinone	clomazone	*Command 3ME*
27	HPPD INHIBITORS	2	Isoxazole	isoxaflutole	*Alite 27,* Balance Flexx*
			Pyrazole	pyrasulfotole	*component of Huskie*
			Pyrazolone	topramezone	*Armezon, Impact*
				tolpyralate	*Shieldex*
			Triketone	mesotrione	*Callisto*
				tembotrione	*Laudis*
				bicyclopyrone	*component of Acuron*
CELL MEMBRANE DISRUPTERS					
14	PPO INHIBITORS	4	Aryl triazinone	carfentrazone	*Aim*
				fluthiacet	*Cadet*
				sulfentrazone	*Spartan 4F*
			Diphenylether	acifluorfen	*Ultra Blazer*
				fomesafen	*Flexstar, Reflex, others*
				lactofen	*Cobra, Phoenix*
			N-phenylphthalimide	flumiclorac	*Resource*
				flumioxazin	*Valor, Chateau, others*
			Pyrimidinedione	saflufenacil	*Sharpen*
22	PHOTOSYSTEM I ELECTRON DIVERTER	5	Bipyridylium	diquat	*Reglone*
				paraquat	*Gramoxone SL*
SEEDLING ROOT GROWTH INHIBITORS					
3	MICROTUBULE INHIBITORS	6	Benzamide	pronamide	*Kerb*
			Dinitroaniline	ethalfluralin	*Sonalan*
				pendimethalin	*Prowl H2O, others*
				trifluralin	*Treflan, others*
SEEDLING SHOOT GROWTH INHIBITORS					
8	LIPID SYNTHESIS INHIBITOR (not ACCase)	5	Thiocarbamate	butylate	*Sutan +*
				cycloate	*Ro-Neet*
				EPTC	*Eradicane, Eptam*
				thiobencarb	*Bolero*
				triallate	*Far-Go*
15	LONG-CHAIN FATTY ACID INHIBITORS	3	Amide	dithiopyr	*Dimension*
				napropamide	*Devrinol*
			Chloroacetamide	acetochlor	*Harness, Surpass, Topnotch, Warrant, others*
				dimethenamid-P	*Outlook*
				s-metolachlor	*Dual Magnum, others*
			Oxyacetamide	flufenacet	*Define*
			Pyrazole	pyrasulfone	*Zidua*
16	SPECIFIC SITE UNKNOWN	0	Benzofurane	ethofumesate	*Nortron*
UNDEFINED					
17	NUCLEIC ACID INHIBITOR	1	Arsenical	MSMA	*MSMA*

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

TAKE ACTION IS ENDORSED BY THE FOLLOWING ORGANIZATIONS:

by PREMIX

This chart lists premix herbicides alphabetically by their trade names so you can identify the premix's component herbicides and their respective site-of-action groups. Refer to the **Site-of-Action** chart on the left for more information.

PREMIX	COMPONENT: ACTIVE INGREDIENT	COMPONENT: TRADE NAME	SITE-OF-ACTION GROUP
ACURON	bicyclopyrone	------	27
	mesotrione	*Callisto*	27
	atrazine	*AAtrex*	5
	s-metolachlor	*Dual II Magnum*	15
ACURON FLEXI	bicyclopyrone	------	27
	mesotrione	*Callisto*	27
	s-metolachlor	*Dual II Magnum*	15
AFFINITY BROADSPEC (Affinity TankMix)	thifensulfuron	*Harmony*	2
	tribenuron	*Express*	2
AFFORIA	thifensulfuron	*Harmony*	2
	tribenuron	*Express*	2
	flumioxazin	*Valor*	14
AGILITY SG	dicamba	*Clarity*	4
	thifensulfuron	*Harmony*	2
	tribenuron	*Express*	2
	metsulfuron	*Ally*	2
ALLY EXTRA	thifensulfuron	*Harmony*	2
	tribenuron	*Express*	2
	metsulfuron	*Ally*	2
ANTHEM FLEX	pyroxasulfone	*Zidua*	15
	carfentrazone	*Aim*	14
ANTHEM MAXX	pyroxasulfone	*Zidua*	15
	fluthiacet	*Cadet*	14
ARMEZON PRO	topramezone	*Armezon*	27
	dimethenamid-P	*Outlook*	15
AUTHORITY ASSIST	sulfentrazone	*Spartan 4F*	14
	imazethapyr	*Pursuit*	2
AUTHORITY EDGE*	sulfentrazone	*Spartan 4F*	14
	pyroxasulfone	*Zidua*	15
AUTHORITY ELITE	sulfentrazone	*Spartan 4F*	14
	s-metolachlor	*Dual Magnum*	15
AUTHORITY FIRST	sulfentrazone	*Spartan 4F*	14
	cloransulam	*FirstRate*	2
AUTHORITY MTZ	sulfentrazone	*Spartan 4F*	14
	metribuzin	*Metribuzin*	5
AUTHORITY SUPREME	sulfentrazone	*Spartan 4F*	14
	pyroxasulfone	*Zidua*	15
AUTHORITY XL (Authority Maxx)	sulfentrazone	*Spartan 4F*	14
	chlorimuron	*Classic*	2
AUTUMN SUPER	iodosulfuron	*Autumn*	2
	thiencarbazone	*Varro*	2
AXIAL BOLD	pinoxaden	*Axial XL*	1
	fenoxaprop	*Ricestar*	1
AXIAL STAR	pinoxaden	*Axial XL*	1
	fluroxypyr	*Starane*	4
BASIS BLEND	rimsulfuron	*Resolve*	2
	thifensulfuron	*Harmony*	2
BETAMIX	desmedipham	*Betenex*	5
	phenmedipham	------	5
BICEP II MAGNUM (Bicep Lite II Magnum)	s-metolachlor	*Dual II Magnum*	15
	atrazine	*AAtrex*	5
BOUNDARY	s-metolachlor	*Dual Magnum*	15
	metribuzin	*Metribuzin*	5
BRAKE F16	fomesafen	*Flexstar*	14
	fluridone	*Sonar*	12
BRAKE FX	fluometuron	*Cotoran*	7
	fluridone	*Sonar*	12
BREAKFREE NXT ATZ (Breakfree NXT Lite)	acetochlor	*Breakfree NXT*	15
	atrazine	*AAtrex*	5
BROADAXE XC	s-metolachlor	*Dual Magnum*	15
	sulfentrazone	*Spartan 4F*	14
BROMATE	bromoxynil	*Maestro*	6
	MCPA	*MCPA*	4
CALLISTO GT	mesotrione	*Callisto*	27
	glyphosate	*glyphosate*	9
CALLISTO XTRA	mesotrione	*Callisto*	27
	atrazine	*AAtrex*	5
CANOPY	chlorimuron	*Classic*	2
	metribuzin	*Metribuzin*	5
CANOPY EX	chlorimuron	*Classic*	2
	tribenuron	*Express*	2
CAPRENO	thiencarbazone	*Varro*	2
	tembotrione	*Laudis*	27
CARNIVORE	MCPA	*MCPA*	4
	clopyralid	*Stinger*	4
	bromoxynil	*Maestro*	6
CHEETAH MAX	glufosinate	*Liberty*	10
	fomesafen	*Reflex*	14
CINCH ATZ (Cinch ATZ Lite)	s-metolachlor	*Dual II Magnum*	15
	atrazine	*AAtrex*	5
CLEARPATH	quinclorac	*Facet*	4
	imazethapyr	*Newpath*	2
COLT + SALVO (Trump Card)	2,4-D	*2,4-D*	4
	fluroxypyr	*Starane*	4
COLT + SWORD	MCPA	*MCPA*	4
	fluroxypyr	*Starane*	4
CORVUS	thiencarbazone	*Varro*	2
	isoxaflutole	*Balance Flexx*	27
COYOTE	s-metolachlor	*Dual II Magnum*	15
	mesotrione	*Callisto*	27
CRUISHER	rimsulfuron	*Resolve*	2
	thifensulfuron	*Harmony*	2
CURTAIL	clopyralid	*Stinger*	4
	2,4-D	*2,4-D*	4
CURTAIL M	clopyralid	*Stinger*	4
	MCPA	*MCPA*	4
DEGREE XTRA	acetochlor	*Degree*	15
	atrazine	*AAtrex*	5
DIFLEXX DUO	dicamba	*DiFlexx*	4
	tembotrione	*Laudis*	27
DIMETRIC CHARGED	metribuzin	*Metribuzin*	5
	flumioxazin	*Valor*	14
ENGENIA PRO*	dicamba	*Engenia*	4
	pyroxasulfone	*Zidua*	15
ENLIST DUO	2,4-D	*2,4-D*	4
	glyphosate	*glyphosate*	9
ENLITE	chlorimuron	*Classic*	2
	thifensulfuron	*Harmony*	2
	flumioxazin	*Valor*	14
ENVIVE	chlorimuron	*Classic*	2
	thifensulfuron	*Harmony*	2
	flumioxazin	*Valor*	14
EXTREME	imazethapyr	*Pursuit*	2
	glyphosate	*glyphosate*	9
FIERCE	flumioxazin	*Valor*	14
	pyroxasulfone	*Zidua*	15
FIERCE MTZ	flumioxazin	*Valor*	14
	pyroxasulfone	*Zidua*	15
	metribuzin	*Metribuzin*	5
FIERCE XLT	flumioxazin	*Valor*	14
	pyroxasulfone	*Zidua*	15
	chlorimuron	*Classic*	2
FINESSE	chlorsulfuron	*Glean*	2
	metsulfuron	*Ally*	2
FIRSTSHOT	thifensulfuron	*Harmony*	2
	tribenuron	*Express*	2
FLEXSTAR GT	fomesafen	*Flexstar*	14
	glyphosate	*glyphosate*	9
FOXFIRE	fenoxaprop	*Tecoma*	1
	pinoxaden	*Axial XL*	1
FULTIME NXT	acetochlor	*TopNotch*	15
	atrazine	*AAtrex*	5
FUSION	fluazifop	*Fusilade DX*	1
	fenoxaprop	*Puma*	1
GANGSTER	flumioxazin	*Valor*	14
	cloransulam	*FirstRate*	2
GOLDSKY	pyroxsulam	*PowerFlex HL*	2
	florasulam	------	2
	fluroxypyr	*Starane*	4
GRAMOXONE MAGNUM*	s-metolachlor	*Dual Magnum*	15
	paraquat	*Gramoxone*	22
GRAZONNEXT HL	aminopyralid	*Milestone*	4
	2,4-D	*2,4-D*	4
HALEX GT	s-metolachlor	*Dual Magnum*	15
	mesotrione	*Callisto*	27
	glyphosate	*glyphosate*	9
HARMONY EXTRA	thifensulfuron	*Harmony*	2
	tribenuron	*Express*	2
HARNESS MAX	acetochlor	*Harness*	15
	mesotrione	*Callisto*	27
HARNESS XTRA	acetochlor	*Harness*	15
	atrazine	*AAtrex*	5
HORNET	clopyralid	*Stinger*	4
	flumetsulam	*Python*	2
HUSKIE	pyrasulfotole	------	27
	bromoxynil	*Maestro*	6
	pyrasulfotole	------	27
HUSKIE COMPLETE	bromoxynil	*Maestro*	6
	thiencarbazone	*Varro*	2
IMPACTZ	atrazine	*AAtrex*	5
	topramezone	*Impact*	27
INSTIGATE	rimsulfuron	*Resolve, Matrix*	2
	mesotrione	*Callisto*	27
INTERMOC	glufosinate	*Liberty*	10
	s-metolachlor	*Dual Magnum*	15
KEYSTONE NXT (Keystone LA NXT)	acetochlor	*Surpass NXT*	15
	atrazine	*AAtrex*	5
KOCHIAVORE	2,4-D	*2,4-D, others*	4
	fluroxypyr	*Starane*	4
	bromoxynil	*Maestro*	6
	mesotrione	*Callisto*	27
LEXAR EZ	s-metolachlor	*Dual II Magnum*	15
	atrazine	*AAtrex*	5
LUMAX EZ	mesotrione	*Callisto*	27
	s-metolachlor	*Dual II Magnum*	15
	atrazine	*AAtrex*	5
MARVEL	fluthiacet	*Cadet*	14
	fomesafen	*Flexstar*	14
OBEY	clomazone	*Command 3ME*	13
	quinclorac	*Facet*	4
OPENSKY	pyroxsulam	*PowerFlex HL*	2
	fluroxypyr	*Starane Ultra*	4
OPTILL	saflufenacil	*Sharpen*	14
	imazethapyr	*Pursuit*	2
OPTILL PRO	imazethapyr	*Pursuit*	2
	dimethenamid-P	*Outlook*	15
ORION	florasulam	------	2
	MCPA	*MCPA*	4
PANOFLEX	thifensulfuron	*Harmony*	2
	tribenuron	*Express*	2
PERMIT PLUS	thifensulfuron	*Harmony*	2
	halosulfuron	*Permit*	2
PERPETUO*	flumiclorac	*Resource*	14
	pyroxasulfone	*Zidua*	15
PREFIX	s-metolachlor	*Dual Magnum*	15
	fomesafen	*Reflex*	14
PREQUEL	rimsulfuron	*Resolve*	2
	isoxaflutole	*Balance*	27
PROGRESS	desmedipham	*Betenex*	5
	phenmedipham	------	5
	ethofumesate	*Nortron*	16
PULSAR	dicamba	*Clarity*	4
	fluroxypyr	*Starane*	4
QUELEX	halauxifen	*Elevore*	4
	florasulam	------	2
RAVE	triasulfuron	*Amber*	2
	dicamba	*Clarity*	4
RAZE	flucarbazone	*Everest*	2
	fluroxypyr	*Starane*	4
REALM Q	rimsulfuron	*Resolve*	2
	mesotrione	*Callisto*	27
REBELEX	cyhalofop	*Clincher*	1
	penoxsulam	*Grasp*	2
RESICORE	clopyralid	*Stinger*	4
	acetochlor	*Surpass NXT*	15
	mesotrione	*Callisto*	27
RESOLVE Q	rimsulfuron	*Resolve*	2
	thifensulfuron	*Harmony*	2
REVULIN Q	nicosulfuron	*Accent Q*	2
	mesotrione	*Callisto*	27
RIMFIRE MAX	propoxycarbazone	*Olympus*	2
	mesosulfuron	*Osprey*	2
ROUNDUP XTEND*	dicamba	*XtendiMax*	4
	glyphosate	*glyphosate*	9
SENTRALLAS	thifensulfuron	*Harmony*	2
	fluroxypyr	*Starane*	4
SEQUENCE	s-metolachlor	*Dual Magnum*	15
	glyphosate	*glyphosate*	9
SOLSTICE	mesotrione	*Callisto*	27
	fluthiacet	*Cadet*	14
SONIC	sulfentrazone	*Spartan 4F*	14
	cloransulam	*FirstRate*	2
SPARTAN CHARGE	sulfentrazone	*Spartan 4F*	14
	carfentrazone	*Aim*	14
STANZA	clopyralid	*Stinger*	4
	flumetsulam	*Python*	2
STARANE FLEX	florasulam	------	2
	fluroxypyr	*Starane*	4
STARANE NXT	fluroxypyr	*Starane*	4
	bromoxynil	*Maestro*	6
STATUS	diflufenzopyr	------	19
	dicamba	*Clarity*	4
STEADFAST Q	nicosulfuron	*Accent Q*	2
	rimsulfuron	*Resolve*	2
STORM	bentazon	*Basagran*	6
	acifluorfen	*Ultra Blazer*	14
SUPREMACY	fluroxypyr	*Starane*	4
	thifensulfuron	*Harmony*	2
	tribenuron	*Express*	2
SUPREND	prometryn	*Caparol*	5
	trifloxysulfuron	*Envoke*	2
SURESTART II	acetochlor	*Surpass NXT*	15
	clopyralid	*Stinger*	4
	flumetsulam	*Python*	2
SURVEIL	flumioxazin	*Valor*	14
	cloransulam	*FirstRate*	2
SYNCHRONY XP	chlorimuron	*Classic*	2
	thifensulfuron	*Harmony*	2
TALINOR	bromoxynil	*Maestro*	6
	bicyclopyrone	------	27
TAVIUM	dicamba	*XtendiMax*	4
	s-metolachlor	*Dual Magnum*	15
TRIPLEFLEX II	acetochlor	*Harness*	15
	clopyralid	*Stinger*	4
	flumetsulam	*Python*	2
TRIPZIN ZC	pendimethalin	*Prowl*	3
	metribuzin	*Metribuzin*	5
TRIVENCE	chlorimuron	*Classic*	2
	flumioxazin	*Valor*	14
	metribuzin	*Metribuzin*	5
VALOR XLT	flumioxazin	*Valor*	14
	chlorimuron	*Classic*	2
VARISTO	imazamox	*Raptor*	2
	bentazon	*Basagran*	6
VELPAR ALFAMAX	hexazinone	*Velpar*	5
	diuron	*Karmex*	7
VERDICT	saflufenacil	*Sharpen*	14
	dimethenamid-P	*Outlook*	15
WARRANT ULTRA	fomesafen	*Reflex*	14
	acetochlor	*Warrant*	15
WELD (FULL DECK)	MCPA	*MCPA*	4
	fluroxypyr	*Starane*	4
	clopyralid	*Stinger*	4
WIDEMATCH	clopyralid	*Stinger*	4
	fluroxypyr	*Starane*	4
WOLVERINE	fenoxaprop	*Tecoma*	1
	pyrasulfotole	-----	27
	bromoxynil	*Maestro*	6
YUKON	dicamba	*Banvel*	4
	halosulfuron	*Permit*	2
ZEMAX	mesotrione	*Callisto*	27
	s-metolachlor	*Dual II Magnum*	15
ZIDUA PRO	imazethapyr	*Pursuit*	2
	saflufenacil	*Sharpen*	14
	pyroxasulfone	*Zidua*	15

*Indicates product is not registered for use at the time of printing.
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