Maryland Grain Producers Association
118 Dundee Ave, Chester, MD 21619
Lindsay.mdag@gmail.com (p) 443-262-8491
www.marylandgrain.com

Date: February 12, 2025

House Bill 386 - Pesticides - PFAS Chemicals - Prohibition

Committee: Health and Government Operations

MGPA Position: OPPOSED

Maryland Grain Producers Association (MGPA) Position on House Bill 386

The Maryland Grain Producers Association (MGPA) serves as the voice of grain farmers across the state, representing those growing corn, wheat, barley, and sorghum. MGPA strongly opposes House Bill 386, which seeks to prohibit the sale of pesticides containing an active ingredient defined as a per- and polyfluoroalkyl substance (PFAS) starting June 1, 2028. Specifically, the bill defines PFAS as: *"A class of fluorinated chemicals that contain at least one fully fluorinated carbon atom, including perfluoroalkyl and polyfluoroalkyl substances."* This proposed legislation would effectively ban many pesticides without an individual evaluation of their risk.

While the exact number of pesticides that would meet this definition is unclear, estimates suggest it could range between 66 and 90 active ingredients across over 1,100 pesticide products. This lack of clarity, combined with the broad nature of the definition, poses a significant threat to the availability of essential tools for Maryland's farmers.

The definition of PFAS in this bill is inconsistent with the working definition used by the U.S. Environmental Protection Agency (EPA), specifically the EPA's Office of Pesticide Programs, which is responsible for regulating pesticides at the federal level. Additionally, the definition conflicts with the one used in the Toxic Substances Control Act. This discrepancy is concerning because the term "PFAS" does not inherently convey whether a compound is harmful—it only indicates that the compound contains a fully fluorinated methyl or methylene carbon atom.[1] Simply containing a fluorinated carbon does not communicate risk to human health or the environment. Therefore, banning pesticides based solely on this broad definition would remove critical tools from farmers' arsenals for controlling pests and weeds, ultimately undermining the production of food, fuel, and fiber.

Pesticide regulation in the U.S. is governed by the EPA, where every pesticide must undergo a rigorous risk assessment for both human health and environmental impact before it can be registered for use. In addition, these chemicals are re-evaluated every 15 years or whenever new scientific data becomes available. Pesticides must meet stringent safety standards to remain in use, ensuring they do not pose "undue risk to human health or the environment." The regulation of potential PFAS-related risks in pesticides should remain under the purview of the EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

Upon reviewing the pesticides affected by this legislation, Maryland's grain farmers have determined that losing many of these herbicides and pesticides would severely hinder their ability to effectively control pests and weeds. For example, nearly 50% of the pre-emergent herbicides currently available for soybean weed control would be banned. Even though alternative products may remain, herbicide rotation is crucial to prevent resistance. This bill would further limit the options available to farmers,

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thereby exacerbating existing challenges in pest management.

Furthermore, this committee commissioned a study in 2023, involving the Maryland Departments of Agriculture, Environment, and Health, along with the EPA, to examine the issue of PFAS in pesticides. The recommendation of that study did not call for banning pesticides based on the one-carbon definition of PFAS. If this committee seeks to further address this issue, we urge you to rely on the expertise of these state and federal departments to ensure sound, science-based decisions.

Maryland farmers do not wish to be passive receivers of PFAS of concern. However, the definition proposed in this bill does not achieve this goal effectively. Moreover, regulating pesticides at the state level creates an unfair disadvantage for Maryland farmers, who would be limited in their ability to use important tools that remain available to farmers in surrounding states.

Farmers are stewards of the land and the original environmentalists. We understand and appreciate the need to minimize unnecessary PFAS in the environment. However, this bill would place Maryland farmers at an unfair disadvantage, limiting their ability to grow crops efficiently or implement critical conservation practices, such as cover crops and no-till farming, on a broad scale.

For these reasons, the MGPA respectfully requests an unfavorable report on House Bill 386.

1. “Reconciling Terminology of the Universe of Per- and Polyfl uoroalkyl Substances: Recommendations and Practical Guidance.” The Organisation for Economic Co-operation and Development (OECD) 2021

HERBICIDE CLASSIFICATION

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

TakeACTION 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[1]	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)	14	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*
			Phenylpyrazoline	pinoxaden	*Axial XL*
AMINO ACID SYNTHESIS INHIBITORS					
2	ALS INHIBITORS (acetolactate synthase)	53	Imidazolinone	imazamox	*Raptor, Beyond*
				imazapic	*Plateau*
				imazapyr	*Arsenal*
				imazaquin	*Scepter*
				imazethapyr	*Pursuit, Newpath*
			Pyrimidinyl benzoates	bispyribac	*Regiment*
				pyrithiobac	*Staple*
			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	*Outrider*
				thifensulfuron	*Harmony*
				triasulfuron	*Amber*
				tribenuron	*Express*
				trifloxysulfuron	*Envoke*
				triflusulfuron	*UpBeet*
			Triazolinones	flucarbazone	*Everest, Pre-Pare*
				propoxycarbazone	*Olympus*
				thiencarbazone	*Varro*
			Triazolopyrimidine - Type 1	florasulam	*component of Orion, Quelex, Starane Flex*
				flumetsulam	*Python*
			Triazolopyrimidine - Type 2	penoxsulam	*Grasp*
				pyroxsulam	*PowerFlex HL*
9	EPSP SYNTHASE INHIBITOR (5-enolpyruvyl-shikimate-3-phosphate)	17	Glycine	glyphosate	*Roundup, several others*
GROWTH REGULATORS					
4	SYNTHETIC AUXINS (TIR1, AFB1-5 and unknown auxin receptor)	10	Benzoate	dicamba	*Banvel, Clarity, DiFlexx, Engenia, XtendiMax, others*
			Phenoxy carboxylate	2,4-D	*2,4-D, Enlist One, others*
				MCPA	*MCPA, others*
			Pyridine carboxylate	aminopyralid	*Milestone*
				clopyralid	*Stinger HL*
				halauxifen	*Elevore*
			Pyridyloxy carboxylate	fluroxypyr	*Starane Ultra*
				triclopyr	*Garlon, Remedy Ultra*
			Quinoline carboxylate	quinclorac	*Facet*
19	AUXIN TRANSPORT INHIBITOR	0	Aryl carboxylate	diflufenzopyr	*component of Status*
PHOTOSYNTHESIS INHIBITORS					
5	PHOTOSYSTEM II INHIBITORS (D1 Serine 264 binders and non-histidine 215 binders)	28	Amide	propanil	*SuperWham*
			Triazine	atrazine	*AAtrex, others*
				prometon	*Pramitol*
				prometryn	*Caparol*
				simazine	*Princep*
			Triazinone	hexazinone	*Velpar*
				metribuzin	*Metribuzin, others*
			Uracil	terbacil	*Sinbar*
			Urea	diuron	*Direx, Karmex*
				fluometuron	*Cotoran*
				linuron	*Lorox, Linex*
				tebuthiuron	*Spike*
6	PHOTOSYSTEM II INHIBITORS (D1 Histidine 215 binders)	1	Benzothiadiazinone	bentazon	*Basagran, others*
			Nitrile	bromoxynil	*Maestro, Moxy, others*
			Phenyl pyridazine	pyridate	*Tough*
NITROGEN METABOLISM INHIBITOR					
10	GLUTAMINE SYNTHETASE INHIBITORS	3	Phosphinic acid	glufosinate	*Liberty, Rely, Nuventa, others*
PIGMENT INHIBITORS					
12	PHYTOENE DESATURASE (PDS) INHIBITORS	1	Diphenyl heterocycle	fluridone	*Brake, Sonar*
			N-Phenyl heterocycle	norflurazon	*Solicam*
			Phenyl ether	diflufenican	-----
13	DOXP SYNTHASE INHIBITOR (1-DEOXY-D-XYULOSE 5-PHOSPHATE)	2	Isoxazolidinone	clomazone	*Command 3ME*
27	HPPD INHIBITORS	2	Isoxazole	isoxaflutole	*Alite 27, Balance Flexx*
			Pyrazole	pyrasulfotole	*component of Huskie*
				topramezone	*Armezon, Impact*
				tolpyralate	*Shieldex*
			Triketone	bicyclopyrone	*Optagen*
				mesotrione	*Callisto*
				tembotrione	*Laudis*
CELL MEMBRANE DISRUPTERS					
14	PPO INHIBITORS	5	Diphenyl ether	acifluorfen	*Ultra Blazer*
				fomesafen	*Flexstar, Reflex, others*
				lactofen	*Cobra, Phoenix*
			N-Phenyl imide	flumiclorac	*Resource*
				flumioxazin	*Valor, Chateau, others*
				saflufenacil	*Sharpen*
				tiafenacil	*Reviton, Gamma*
			N-Phenyl triazolinone	carfentrazone	*Aim*
				sulfentrazone	*Spartan*
22	PHOTOSYSTEM I ELECTRON DIVERTER	6	Pyridinium	diquat	*Reglone*
				paraquat	*Gramoxone SL*
SEEDLING ROOT GROWTH INHIBITORS					
3	MICROTUBULE ASSEMBLY INHIBITORS	6	Benzamide	pronamide	*Kerb*
			Dinitroaniline	ethalfluralin	*Sonalan*
				pendimethalin	*Prowl H2O, others*
				trifluralin	*Treflan, others*
			Pyridine	dithiopyr	*Dimension*
SEEDLING SHOOT GROWTH INHIBITORS					
15	VERY LONG-CHAIN FATTY ACID SYNTHESIS INHIBITORS	8	Benzofuranе	ethofumesate	*Nortron*
			α-Chloroacetamide	acetochlor	*Harness, Surpass, Warrant, others*
				dimethenamid-P	*Outlook*
				s-metolachlor	*Dual Magnum, others*
			Isoxazoline	pyroxasulfone	*Zidua*
			α-Oxyacetamide	flufenacet	*Define*
			Thiocarbamate	cycloate	*Ro-Neet*
				EPTC	*Eradicane, Eptam*
				thiobencarb	*Bolero*
				triallate	*Far-Go*
29	CELLULOSE BIOSYNTHESIS INHIBITORS	1	Aylkylazine	indaziflam	*Esplanade, Rezilon*
			Benzamide	isoxaben	*Gallery, Trellis*
UNDEFINED					
0	UNKNOWN	1	Amide	napropamide	*Devrinol*
			Arsenical	MSMA	*MSMA*

[1]Site-of-action group numbers follow the revised 2020 Herbicide Resistance Action Committee (HRAC) classification.

For more information and links to additional resources, visit ***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 SITE-OF-ACTION GROUP
ACURON	bicyclopyrone	27
	mesotrione	27
	atrazine	5
	s-metolachlor	15
ACURON FLEXI	bicyclopyrone	27
	mesotrione	27
	s-metolachlor	15
ACURON GT	bicyclopyrone	27
	mesotrione	27
	s-metolachlor	15
	glyphosate	9
AFFINITY BROADSPEC (Affinity TankMix)	thifensulfuron	2
	tribenuron	2
AFFORIA	thifensulfuron	2
	tribenuron	2
	flumioxazin	14
AGILITY SG	dicamba	4
	thifensulfuron	2
	tribenuron	2
	metsulfuron	2
ALLY EXTRA	thifensulfuron	2
	tribenuron	2
	metsulfuron	2
ANTHEM FLEX	pyroxasulfone	15
	carfentrazone	14
ANTHEM MAXX	pyroxasulfone	15
	fluthiacet	14
ARMEZON PRO	topramezone	27
	dimethenamid-P	15
AUTHORITY ASSIST	sulfentrazone	14
	imazethapyr	2
AUTHORITY EDGE	sulfentrazone	14
	pyroxasulfone	15
AUTHORITY ELITE	sulfentrazone	14
	s-metolachlor	15
AUTHORITY FIRST	sulfentrazone	14
	cloransulam	2
AUTHORITY MTZ (Preview 2.1)	sulfentrazone	14
	metribuzin	5
AUTHORITY SUPREME	sulfentrazone	14
	pyroxasulfone	15
AUTHORITY XL (Authority Maxx)	sulfentrazone	14
	chlorimuron	2
AUTUMN SUPER	iodosulfuron	2
	thiencarbazone	2
AXIAL BOLD	pinoxaden	1
	fenoxaprop	1
AXIAL STAR	pinoxaden	1
	fluroxypyr	4
BASIS BLEND	rimsulfuron	2
	thifensulfuron	2
BICEP II MAGNUM (Bicep Lite II Magnum)	s-metolachlor	15
	atrazine	5
BOUNDARY	s-metolachlor	15
	metribuzin	5
BROADAXE XC	s-metolachlor	15
	sulfentrazone	14
BRONATE ADVANCED	bromoxynil	6
	MCPA	4
CALIBRA	s-metolachlor	15
	mesotrione	27
CALLISTO GT	mesotrione	27
	glyphosate	9
CALLISTO XTRA	mesotrione	27
	atrazine	5
CANOPY	chlorimuron	2
	metribuzin	5
CANOPY EX	chlorimuron	2
	tribenuron	2
CAPRENO	thiencarbazone	2
	tembotrione	27
CARNIVORE	MCPA	4
	clopyralid	4
	bromoxynil	6
CHEETAH MAX	glufosinate	10
	fomesafen	14
CINCH ATZ (Cinch ATZ Lite)	s-metolachlor	15
	atrazine	5
CLEARPATH	quinclorac	4
	imazethapyr	2
COLT AS	clopyralid	4
	fluroxypyr	4
COLT + SALVO	2,4-D	4
	fluroxypyr	4
COLT + SWORD	MCPA	4
	fluroxypyr	4
CORVUS	thiencarbazone	2
	isoxaflutole	27
COYOTE	s-metolachlor	15
	mesotrione	27
CRUSHER	rimsulfuron	2
	thifensulfuron	2
CURTAIL	clopyralid	4
	2,4-D	4
CURTAIL M	clopyralid	4
	MCPA	4
DEGREE XTRA	acetochlor	15
	atrazine	5
DIFLEXX DUO	dicamba	4
	tembotrione	27
DIMETRIC CHARGED	metribuzin	5
	flumioxazin	14
ENLIST DUO	2,4-D	4
	glyphosate	9
ENLITE	chlorimuron	2
	thifensulfuron	2
	flumioxazin	14
ENVIVE	chlorimuron	2
	thifensulfuron	2
	flumioxazin	14
EXTREME	imazethapyr	2
	glyphosate	9
FIERCE EZ	flumioxazin	14
	pyroxasulfone	15
FIERCE MTZ	flumioxazin	14
	pyroxasulfone	15
	metribuzin	5
FIERCE XLT	flumioxazin	14
	pyroxasulfone	15
	chlorimuron	2
FINESSE	chlorsulfuron	2
	metsulfuron	2
FIRSTSHOT	thifensulfuron	2
	tribenuron	2
FLEXSTAR GT	fomesafen	14
	glyphosate	9
FULTIME NXT	acetochlor	15
	atrazine	5
FUSION	fluazifop	1
	fenoxaprop	1
GOLDSKY	pyroxasulfone	15
	florasulam	2
	fluroxypyr	4
GRAZONNEXT HL	aminopyralid	4
	2,4-D	4
HALEX GT	s-metolachlor	15
	mesotrione	27
	glyphosate	9
HARMONY EXTRA	thifensulfuron	2
	tribenuron	2
HARNESS MAX	acetochlor	15
	mesotrione	27
HARNESS XTRA	acetochlor	15
	atrazine	5
HORNET	clopyralid	4
	flumetsulam	2
HUSKIE	pyrasulfotole	27
	bromoxynil	6
HUSKIE COMPLETE	pyrasulfotole	27
	bromoxynil	6
	thiencarbazone	2
HUSKIE FX	pyrasulfotole	27
	bromoxynil	6
	fluroxypyr	4

PREMIX	COMPONENT ACTIVE INGREDIENT	COMPONENT SITE-OF-ACTION GROUP
IMPACT CORE	acetochlor	15
	topramezone	27
IMPACTZ	atrazine	5
	topramezone	27
INTERMOC	glufosinate	10
	s-metolachlor	15
KATAGON	nicosulfuron	2
	tolpyralate	27
KEYSTONE NXT (Keystone LA NXT)	acetochlor	15
	atrazine	5
KOCHAVORE	2,4-D	4
	fluroxypyr	4
	bromoxynil	6
KYBER	flumioxazin	14
	pyroxasulfone	15
	metribuzin	5
LEADOFF	rimsulfuron	2
	thifensulfuron	2
LEXAR EZ	mesotrione	27
	s-metolachlor	15
	atrazine	5
LUMAX EZ	mesotrione	27
	s-metolachlor	15
	atrazine	5
MARVEL	fluthiacet	14
	fomesafen	14
MAVERICK	pyroxasulfone	15
	clopyralid	4
	flumetsulam	2
NOVIXID	florpyrauxifen	4
	penoxsulam	2
OBEY	clomazone	13
	quinclorac	4
OPENSKY	pyroxsulam	2
	fluroxypyr	4
ORION	florasulam	2
	MCPA	4
OSPREY XTRA	mesosulfuron	2
	thiencarbazone	2
PANOFLEX	thifensulfuron	2
	tribenuron	2
PERFECTMATCH	clopyralid	4
	fluroxypyr	4
	pyroxsulam	2
PERMIT PLUS	thifensulfuron	2
	halosulfuron	2
PERPETUO	flumiclorac	14
	pyroxasulfone	15
PIXXARO EC	fluroxypyr	4
	halauxifen	4
PREFIX	s-metolachlor	15
	fomesafen	14
QUELEX	halauxifen	4
	florasulam	2
RAVE	triasulfuron	2
	dicamba	4
REALM Q	rimsulfuron	2
	mesotrione	27
REBELEX	cyhalofop	1
	penoxsulam	2
RESICORE XL	clopyralid	4
	acetochlor	15
	mesotrione	27
RESOLVE Q	rimsulfuron	2
	thifensulfuron	2
RESTRAINT	acetochlor	15
	tolpyralate	27
REVULIN Q	nicosulfuron	2
	mesotrione	27
REZUVANT	halauxifen	4
	fluroxypyr	4
RIMFIRE MAX	pinoxaden	1
	propoxycarbazone	2
SENTRALLAS	mesosulfuron	2
	thifensulfuron	2
SEQUENCE	fluroxypyr	4
	s-metolachlor	15
SINATE	glyphosate	9
	glufosinate	10
SOLSTICE	topramezone	27
	mesotrione	27
SONIC	fluthiacet	14
	sulfentrazone	14
SPARTAN CHARGE	cloransulam	2
	sulfentrazone	14
STARANE FLEX	carfentrazone	14
	florasulam	2
STARANE NXT	fluroxypyr	4
	fluroxypyr	4
STATUS	bromoxynil	6
	diflufenzopyr	19
STEADFAST Q	dicamba	4
	nicosulfuron	2
STORM	rimsulfuron	2
	bentazon	6
SUPREMACY	acifluorfen	14
	fluroxypyr	4
SURESTART II	tribenuron	2
	acetochlor	15
	clopyralid	4
SURVEIL	flumetsulam	2
	flumioxazin	14
SYNCHRONY XP	cloransulam	2
	chlorimuron	2
TALINOR	thifensulfuron	2
	bromoxynil	6
TARZEC	bicyclopyrone	27
	pyroxasulfone	15
TAVIUM	halauxifen	4
	dicamba	4
TENDOVO	s-metholachlor	15
	s-methelachlor	15
	cloransulam	2
TRIPLEFLEX II	metribuzin	5
	acetochlor	15
	clopyralid	4
TRIPZIN ZC	flumetsulam	2
	pendimethalin	3
TRIVENCE	metribuzin	5
	chlorimuron	2
TRIVOLT	flumioxazin	14
	metribuzin	5
VALOR XLT	flufenacet	15
	isoxaflutole	27
	thiencarbazone	2
VARISTO	fluminazin	14
	chlorimuron	2
VELPAR ALFAMAX	imazamox	2
	bentazon	6
VERDICT	hexazinone	5
	diuron	5
WARRANT ULTRA	saflufenacil	14
	dimethenamid-P	15
WELD	fomesafen	14
	acetochlor	15
WIDEARMATCH	MCPA	4
	fluroxypyr	4
	clopyralid	4
WIDEMATCH	clopyralid	4
	fluroxypyr	4
WOLVERINE	fenoxaprop	1
	pyrasulfotole	27
YUKON	bromoxynil	6
	dicamba	4
ZIDUA PRO	halosulfuron	2
	imazethypyr	2
ZONE DEFENSE	saflufenacil	14
	pyroxasulfone	15
	sulfentrazone	14
	fluminazin	14

*Indicates product is not registered for use at the time of printing.
Check for a Label and Material Safety Data Sheet at www.cdms.net to confirm status. This chart contains some restricted use pesticides. Always consult label prior to use.
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1	ACCASE INHIBITORS (acetyl CoA carboxylase)	14	Aryloxyphenoxypropionate (fops)	clodinafop	*Discover NG*
				cyhalofop	*Clincher*
				fenoxaprop	*Ricestar HT, others*
				[redacted]	[redacted]
				quizalofop	*Aggressor, Assure II, Targa*
			Cyclohexanedione (dims)	clethodim	*Select Max, others*
				sethoxydim	*Poast, Poast Plus*
			Phenylpyrazoline	pinoxaden	*Axial XL*
AMINO ACID SYNTHESIS INHIBITORS					
2	ALS INHIBITORS (acetolactate synthase)	53	Imidazolinone	imazamox	*Raptor, Beyond*
				imazapic	*Plateau*
				imazapyr	*Arsenal*
				imazaquin	*Scepter*
				imazethapyr	*Pursuit, Newpath*
			Pyrimidinyl benzoates	bispyribac	*Regiment*
				pyrithiobac	*Staple*
			Sulfonylurea	bensulfuron	*Londax*
				chlorimuron	*Classic*
				chlorsulfuron	*Glean*
				halosulfuron	*Permit, Sandea*
				iodosulfuron	*Autumn*
				mesosulfuron	*Osprey*
				metsulfuron	*Ally*
				nicosulfuron	*Accent Q, Zest*
				orthosulfamuron	*Strada*
				primisulfuron	*Beacon*
				[redacted]	[redacted]
				rimsulfuron	*Matrix, Resolve*
				sulfosulfuron	*Outrider*
				thifensulfuron	*Harmony*
				triasulfuron	*Amber*
				tribenuron	*Express*
				trifloxysulfuron	*Envoke*
				[redacted]	[redacted]
			Triazolinones	flucarbazone	*Everest, Pre-Pare*
				propoxycarbazone	*Olympus*
				thiencarbazone	*Varro*
			Triazolopyrimidine - Type 1	[redacted]	[redacted]
				[redacted]	[redacted]
				[redacted]	[redacted]
			Triazolopyrimidine - Type 2	[redacted]	[redacted]
				[redacted]	[redacted]
9	EPSP SYNTHASE INHIBITOR (5-enolpyruvyl-shikimate-3-phosphate)	17	Glycine	glyphosate	*Roundup, several others*
GROWTH REGULATORS					
4	SYNTHETIC AUXINS (TIR1, AFB1-5 and unknown auxin receptor)	10	Benzoate	dicamba	*Banvel, Clarity, DiFlexx, Engenia, XtendiMax, others*
			Phenoxy carboxylate	2,4-D	*2,4-D, Enlist One, others*
				MCPA	*MCPA, others*
			Pyridine carboxylate	aminopyralid	*Milestone*
				clopyralid	*Stinger HL*
				[redacted]	[redacted]
			Pyridyloxy carboxylate	[redacted]	[redacted]
				triclopyr	*Garlon, Remedy Ultra*
			Quinoline carboxylate	quinclorac	*Facet*
19	AUXIN TRANSPORT INHIBITOR	0	Aryl carboxylate	[redacted]	[redacted]
PHOTOSYNTHESIS INHIBITORS					
5	PHOTOSYSTEM II INHIBITORS (D1 Serine 264 binders and non-histidine 215 binders)	28	Amide	propanil	*SuperWham*
			Triazine	atrazine	*AAtrex, others*
				prometon	*Pramitol*
				prometryn	*Caparol*
				simazine	*Princep*
			Triazinone	hexazinone	*Velpar*
				metribuzin	*Metribuzin, others*
			Uracil	terbacil	*Sinbar*
			Urea	diuron	*Direx, Karmex*
				fluometuron	*Cotoran*
				linuron	*Lorox, Linex*
				tebuthiuron	*Spike*
6	PHOTOSYSTEM II INHIBITORS (D1 Histidine 215 binders)	1	Benzothiadiazinone	bentazon	*Basagran, others*
			Nitrile	bromoxynil	*Maestro, Moxy, others*
			Phenyl pyridazine	pyridate	*Tough*
NITROGEN METABOLISM INHIBITOR					
10	GLUTAMINE SYNTHETASE INHIBITORS	3	Phosphinic acid	glufosinate	*Liberty, Rely, Noventa, others*
PIGMENT INHIBITORS					
12	PHYTOENE DESATURASE (PDS) INHIBITORS	1	Diphenyl heterocycle	[redacted]	[redacted]
			N-Phenyl heterocycle	[redacted]	[redacted]
			Phenyl ether	diflufenican	-----
13	DOXP SYNTHASE INHIBITOR (1-DEOXY-D-XYLULOSE 5-PHOSPHATE)	2	Isoxazolidinone	clomazone	*Command 3ME*
27	HPPD INHIBITORS	2	Isoxazole	[redacted]	[redacted]
			Pyrazole	[redacted]	[redacted]
				topramezone	*Armezon, Impact*
				tolpyralate	*Shieldex*
			Triketone	[redacted]	[redacted]
				mesotrione	*Callisto*
				[redacted]	[redacted]
CELL MEMBRANE DISRUPTERS					
14	PPO INHIBITORS	5	Diphenyl ether	[redacted]	[redacted]
				[redacted]	[redacted]
				[redacted]	[redacted]
			N-Phenyl imide	[redacted]	[redacted]
				[redacted]	[redacted]
				[redacted]	[redacted]
				[redacted]	[redacted]
			N-Phenyl triazolinone	[redacted]	[redacted]
				sulfentrazone	*Spartan*
22	PHOTOSYSTEM I ELECTRON DIVERTER	6	Pyridinium	diquat	*Reglone*
				paraquat	*Gramoxone SL*
SEEDLING ROOT GROWTH INHIBITORS					
3	MICROTUBULE ASSEMBLY INHIBITORS	6	Benzamide	pronamide	*Kerb*
			Dinitroaniline	[redacted]	[redacted]
				pendimethalin	*Prowl H_2O, others*
				[redacted]	[redacted]
			Pyridine	[redacted]	[redacted]
SEEDLING SHOOT GROWTH INHIBITORS					
15	VERY LONG-CHAIN FATTY ACID SYNTHESIS INHIBITORS	8	Benzofurane	ethofumesate	*Nortron*
			α-Chloroacetamide	acetochlor	*Harness, Surpass, Warrant, others*
				dimethenamid-P	*Outlook*
				s-metolachlor	*Dual Magnum, others*
			Isoxazoline	[redacted]	[redacted]
			α-Oxyacetamide	[redacted]	[redacted]
			Thiocarbamate	cycloate	*Ro-Neet*
				EPTC	*Eradicane, Eptam*
				thiobencarb	*Bolero*
				triallate	*Far-Go*
29	CELLULOSE BIOSYNTHESIS INHIBITORS	1	Aylkylazine	indaziflam	*Esplanade, Rezilon*
			Benzamide	isoxaben	*Gallery, Trellis*
UNDEFINED					
0	UNKNOWN	1	Amide	napropamide	*Devrinol*
			Arsenical	MSMA	*MSMA*

[1]Site-of-action group numbers follow the revised 2020 Herbicide Resistance Action Committee (HRAC) classification.

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
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
AFFINITY BROADSPEC (Affinity TankMix)	thifensulfuron	*Harmony*	2
	tribenuron	*Express*	2
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
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
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
ARMEZON PRO	topramezone	*Armezon*	27
	dimethenamid-P	*Outlook*	15
AUTHORITY ASSIST	sulfentrazone	*Spartan*	14
	imazethapyr	*Pursuit*	2
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
AUTHORITY ELITE	sulfentrazone	*Spartan*	14
	s-metolachlor	*Dual Magnum*	15
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
AUTHORITY MTZ (Preview 2.1)	sulfentrazone	*Spartan*	14
	metribuzin	*Metribuzin*	5
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
AUTHORITY XL (Authority Maxx)	sulfentrazone	*Spartan*	14
	chlorimuron	*Classic*	2
AUTUMN SUPER	iodosulfuron	*Autumn*	2
	thiencarbazone	*Varro*	2
AXIAL BOLD	pinoxaden	*Axial XL*	1
	fenoxaprop	*Ricestar*	1
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
BASIS BLEND	rimsulfuron	*Resolve*	2
	thifensulfuron	*Harmony*	2
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
BROADAXE XC	s-metolachlor	*Dual Magnum*	15
	sulfentrazone	*Spartan 4F*	14
BRONATE ADVANCED	bromoxynil	*Maestro*	6
	MCPA	*MCPA*	4
CALIBRA	s-metolachlor	*Dual II Magnum*	15
	mesotrione	*Callisto*	27
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
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
CINCH ATZ (Cinch ATZ Lite)	s-metolachlor	*Dual II Magnum*	15
	atrazine	*AAtrex*	5
CLEARPATH	quinclorac	*Facet*	4
	imazethapyr	*Newpath*	2
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
COYOTE	s-metolachlor	*Dual II Magnum*	15
	mesotrione	*Callisto*	27
CRUSHER	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
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
DIMETRIC CHARGED	metribuzin	*Metribuzin*	5
	flumioxazin	*Valor*	14
ENLIST DUO	2,4-D	*2,4-D*	4
	glyphosate	*glyphosate*	9
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
EXTREME	imazethapyr	*Pursuit*	2
	glyphosate	*glyphosate*	9
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	5
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
FINESSE	chlorsulfuron	*Glean*	2
	metsulfuron	*Ally*	2
FIRSTSHOT	thifensulfuron	*Harmony*	2
	tribenuron	*Express*	2
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
FULTIME NXT	acetochlor	*TopNotch*	15
	atrazine	*AAtrex*	5
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
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
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
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	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]

PREMIX	COMPONENT: ACTIVE INGREDIENT	COMPONENT: TRADE NAME	SITE-OF-ACTION GROUP
IMPACT CORE	acetochlor	*Harness*	15
	topramezone	*Impact*	27
IMPACTZ	atrazine	*AAtrex*	5
	topramezone	*Impact*	27
INTERMOC	glufosinate	*Liberty*	10
	s-metolachlor	*Dual Magnum*	15
KATAGON	nicosulfuron	*Accent Q*	2
	tolpyralate	*Shieldex*	27
KEYSTONE NXT (Keystone LA NXT)	acetochlor	*Surpass NXT*	15
	atrazine	*AAtrex*	5
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
LEADOFF	rimsulfuron	*Resolve*	2
	thifensulfuron	*Harmony*	2
LEXAR EZ	mesotrione	*Callisto*	27
	s-metolachlor	*Dual II Magnum*	15
	atrazine	*AAtrex*	5
LUMAX EZ	mesotrione	*Callisto*	27
	s-metolachlor	*Dual II Magnum*	15
	atrazine	*AAtrex*	5
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
OBEY	clomazone	*Command 3ME*	13
	quinclorac	*Facet*	4
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
ORION	florasulam	-----	2
	MCPA	*MCPA*	4
OSPREY XTRA	mesosulfuron	*Osprey*	2
	thiencarbazone	*Varro*	2
PANOFLEX	thifensulfuron	*Harmony*	2
	tribenuron	*Express*	2
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
PERMIT PLUS	thifensulfuron	*Harmony*	2
	halosulfuron	*Permit*	2
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
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	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
RAVE	triasulfuron	*Amber*	2
	dicamba	*Clarity*	4
REALM Q	rimsulfuron	*Resolve*	2
	mesotrione	*Callisto*	27
REBELEX	cyhalofop	*Clincher*	1
	penoxsulam	*Grasp*	2
RESICORE XL	clopyralid	*Stinger*	4
	acetochlor	*Surpass NXT*	15
	mesotrione	*Callisto*	27
RESOLVE Q	rimsulfuron	*Resolve*	2
	thifensulfuron	*Harmony*	2
RESTRAINT	acetochlor	*Harness*	15
	tolpyralate	*Shieldex*	27
REVULIN Q	nicosulfuron	*Accent Q*	2
	mesotrione	*Callisto*	27
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
RIMFIRE MAX	propoxycarbazone	*Olympus*	2
	mesosulfuron	*Osprey*	2
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
SEQUENCE	s-metolachlor	*Dual Magnum*	15
	glyphosate	*glyphosate*	9
SINATE	glufosinate	*Liberty*	10
	topramezone	*Impact*	27
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	2
[redacted]	[redacted]	[redacted]	[redacted]
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[redacted]	[redacted]	[redacted]	[redacted]
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	[redacted]	[redacted]	[redacted]
STEADFAST Q	nicosulfuron	*Accent Q*	2
	rimsulfuron	*Resolve*	2
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
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[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
SYNCHRONY XP	chlorimuron	*Classic*	2
	thifensulfuron	*Harmony*	2
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
TAVIUM	dicamba	*XtendiMax*	4
	s-metholachlor	*Dual Magnum*	15
[redacted]	[redacted]	[redacted]	[redacted]
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	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
TRIPZIN ZC	pendimethalin	*Prowl*	3
	metribuzin	*Metribuzin*	5
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
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	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
VARISTO	imazamox	*Raptor*	2
	bentazon	*Basagran*	6
VELPAR ALFAMAX	hexazinone	*Velpar*	5
	diuron	*Karmex*	5
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
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[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
YUKON	dicamba	*Banvel*	4
	halosulfuron	*Permit*	2
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]

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

TAKE ACTION IS ENDORSED BY THE FOLLOWING ORGANIZATIONS:

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

Check for a label and Material Safety Data Sheet at www.cdms.net to confirm status. This chart contains some restricted use pesticides. Always consult label prior to use.

Technical editing for this publication was led by 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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