

W1947 (Revised January 2024)

North Dakota Herbicide Chart

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

By Mode of Action (effect on plant growth)

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

The Site of Action Group is a classification system developed by the Weed Science Society of America and Herbicide

Site of Action Group	Site of Action	Chemical Family	Active Ingredient	Product Examples Trade Name ®	
1	ACCase Inhibitors (acetyl CoA carboxylase)	14	Aryloxyphenoxy propionate "Fop"	clodinafop-propargyl fenoxaprop-P ethyl fluzafop-P butyl quizalofop-P ethyl	Discover NG Tacoma, others Fusilade DX Assure II, Targa
			Cyclohexanedione "Dim"	clethodim sethoxydim	Select Max, Arrow, others Poast, others
			Phenylpyrazolin "Den"	pinoxaden	Axial XL

Site of Action Group	Site of Action	Chemical Family	Active Ingredient	Product Examples Trade Name ®	
2	ALS Inhibitors (acetolactate synthase)	55	Imidazolinone "Imi"	imazamox imazapic imazethapyr	Beyond Xtra Plateau Pursuit
			Sulfonylurea "SU"	halosulfuron mesosulfuron metsulfuron-methyl nicosulfuron rimsulfuron sulfosulfuron thifensulfuron tribenuron triflusalufuron	Permit, others Osprey Ally, Cimarron, Escort, others Accent Q Matrix, Resolve, others Outrider Harmony, others Express, others UpBeet
			Triazolopyrimidine "TPS"	cloransulam florasulam flumetsulam pyroxulam	FirstRate component of several Python PowerFlex HL
	Triazolinones "SACT"	flucarbazone propoxycarbazone thiencarbazone	Everest 3.0, Prepare, others Olympus Varro		

Site of Action Group	Site of Action	Chemical Family	Active Ingredient	Product Examples Trade Name ®	
9	EPSP Synthase Inhibitor (5-enolpyruvyl-shikimate -3-phosphate)	18	Glycine	glyphosate	Roundup, others

Site of Action Group	Site of Action	Chemical Family	Active Ingredient	Product Examples Trade Name ®	
4	Synthetic Auxins TIR1, AFB1-5, and Unknown auxin receptor	11	Benzoic acid	dicamba	Banvel, Clarity, Engenia, DiFlexx, Xtendimax, others
			Phenoxy	2,4-D MCPA	2,4-D, Enlist One, others MCPA, others
			Pyridine	clopyralid halauxifen-methyl	Stinger, others Elevore
			Pyridyloxy	fluroxypyr	Starane, others
	Quinoline	quinclorac	Facet		

Site of Action Group	Site of Action	Chemical Family	Active Ingredient	Product Examples Trade Name ®	
19	Auxin Transport Inhibitor	0	Aryl carboxylate	diflufenzopyr	component of Status

Site of Action Group	Site of Action	Chemical Family	Active Ingredient	Product Examples Trade Name ®	
5	Photosystem II Inhibitors D1 Serine 264 binders and non-histidine 215 binders	28	Phenyl-carbamate	phenmedipham	Spin-Aid
			Triazine	atrazine	AAtrex, others
			Triazinone	metribuzin	Metribuzin, others
			Ureas	linuron	Lorox, others

Site of Action Group	Site of Action	Chemical Family	Active Ingredient	Product Examples Trade Name ®	
6	Photosystem II Inhibitors D1 Histidine 215 binders	2	Benzothiadiazole	bentazon	Basagran 5L, others
			Nitrile	bromoxynil	Buctril, others
			Phenyl pyridazine	pyridate	Tough

Site of Action Group	Site of Action	Chemical Family	Active Ingredient	Product Examples Trade Name ®	
10	Glutamine Synthetase Inhibitor	3	Phosphinic acid	glufosinate	Liberty 280, others

Site of Action Group	Site of Action	Chemical Family	Active Ingredient	Product Examples Trade Name ®	
27	HPPD Inhibitors	3	Isoxazole	isoxaflutole	Balance Flexx
			Pyrazole	pyrasulfotole tolpyralate topramezone	component of Huskie Shieldex Armezon, Impact
			Triketone	mesotrione tembotrione bicyclopyrone	Callisto Laudis Optogen

Site of Action Group	Site of Action	Chemical Family	Active Ingredient	Product Examples Trade Name ®	
14	PPO Inhibitors	8	Diphenylether	acifluorfen fomesafen lactofen	Ultra Blazer Flexstar, Reflex, others Cobra, Phoenix
			N-phenyl imide	flumiclorac flumioxazin fluthiacet-methyl saflufenacil tiafenacil	Resource Valor EZ Cadet Sharpen Reviton
			Phenylpyrazole	pyraflufen	ET, Vida
			N-Phenyl triazolinone	carfentrazone sulfentrazone	Aim Spartan

Site of Action Group	Site of Action	Chemical Family	Active Ingredient	Product Examples Trade Name ®	
22	Photosystem I Electron Diverter	6	Pyridinium	diquat paraquat	Reglone, others Gramoxone, others

Site of Action Group	Site of Action	Chemical Family	Active Ingredient	Product Examples Trade Name ®	
3	Microtubule Assembly Inhibitors	6	Dinitroaniline	ethafluralin pendimethalin trifluralin	Sonalan Prowl H ₂ O, others Treflan, others

Site of Action Group	Site of Action	Chemical Family	Active Ingredient	Product Examples Trade Name ®	
15	Very Long-Chain Fatty Acid Synthesis Inhibitor	8	α-Chloroacetamide	acetochlor metolachlor dimethenamid-P	Harness, Surpass, Warrant Dual, others Outlook
			Benzofuran	ethofumesate	Norton, others
			Isoxazoline	pyroxasulfone	Zidua SC
			Thiocarbamate	cycloate EPTC triallate	Ro-Neet SB Eptam, others Far-Go, Avadex MA
			α-Oxyacetamide	flufenacet	Define

Site of Action Group	Site of Action	Chemical Family	Active Ingredient	Product Examples Trade Name ®	
99		0			Cultivator, Plow, others

* indicates product is not registered for use at the time of printing. Check for a label and MSDS at www.cdms.net to confirm status.

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 Mode of Action chart on the left for more information.

Premix Trade Name ®	Component Trade Name ®	Active Ingredient	Site of Action Group
Acuron	AAtrex	atrazine	5
	Callisto	mesotrione	27
	Dual II Magnum	S-metolachlor	15
	Optogen	bicyclopyrone	27
Acuron Flexi	Callisto	mesotrione	27
	Dual II Magnum	S-metolachlor	15
	Optogen	bicyclopyrone	27
Acuron GT	Callisto	mesotrione	27
	Dual II Magnum	S-metolachlor	15
	Roundup	glyphosate	9
	Optogen	bicyclopyrone	27
Afforia	Harmony Express	thifensulfuron tribenuron	2
	Valor	flumioxazin	14
			14
Anthem Flex	Aim	carfentrazone-ethyl	14
	Zidua	pyroxasulfone	15
Armezon Pro	Outlook	dimethenamid-P	15
	Armezon	topramezone	27
Authority Assist	Pursuit	imazethapyr	2
	Spartan	sulfentrazone	14
Authority First or Sonic	FirstRate	cloransulam	2
	Spartan	sulfentrazone	14
Authority MTZ or Preview 2.1	Metribuzin	metribuzin	5
	Spartan	sulfentrazone	14
Authority Supreme or Authority Edge	Spartan	sulfentrazone	14
	Zidua	pyroxasulfone	15
Axial Bold	Tacoma	fenoxaprop-P ethyl	1
	Axial XL	pinoxaden	1
Axial Star	Tacoma	fenoxaprop-P ethyl	1
	Starane	fluroxypyr	4
Boundary	Metribuzin	metribuzin	5
	Dual II Magnum	S-metolachlor	15
BroadAxe XC or Authority Elite	Spartan	sulfentrazone	14
	Dual Magnum	S-metolachlor	15
Bronate	Maestro	bromoxynil	6
	MCPA	MCPA	4
Calibra	Callisto	mesotrione	27
	Dual II Magnum	S-metolachlor	15
Capreno	Varro	thiencarbazon	2
	Laudis	tembotrione	27
Carnivore	MCPA	MCPA	4
	Starane	fluroxypyr	4
	Maestro	bromoxynil	6
Colt + Salvo	2,4-D	2,4-D	4
	Starane	fluroxypyr	4
Colt + Sword	MCPA	MCPA	4
	Starane	fluroxypyr	4
Corvus	Varro	thiencarbazon	2
	Balance Flexx	isoxaflutole	27
Curtail	Stinger	clopyralid	4
	2,4-D	2,4-D	4
Curtail M	Stinger	clopyralid	4
	MCPA	MCPA	4
DiFlexx Duo	Clarity	dicamba	4
	Laudis	tembotrione	27
Enlist Duo	Enlist One	2,4-D	4
	Durango	glyphosate	9
Fierce EZ	Valor	flumioxazin	14
	Zidua	pyroxasulfone	15
Fierce MTZ	Valor	flumioxazin	14
	Zidua	pyroxasulfone	15
Flexstar GT	Roundup	glyphosate	9
	Flexstar	fomesafen	14
Halex GT	Roundup	glyphosate	9
	Dual II Magnum	S-metolachlor	15
Harness Max	Callisto	mesotrione	27
	Harness	acetochlor	15
Huskie	Callisto	mesotrione	27
	Buctril	bromoxynil	6
Huskie Complete	Buctril	bromoxynil	6
	Varro	thiencarbazon	2
Huskie FX	Buctril	bromoxynil	6
	Starane	fluroxypyr	4
Impact CORE	Buctril	bromoxynil	6
	Varro	thiencarbazon	2
ImpactZ	Impact	topramezone	27
	AAtrex	atrazine	5
Instigate or Realm Q	Resolve	rimsulfuron	2
	Callisto	mesotrione	27
Intermoc	Interline	glufosinate	10
	Dual Magnum	S-metolachlor	15
Katagon	Accent Q	nicosulfuron	2
	Shieldex	tolpyralate	27
Keystone NXT or Keystone LA NXT	Surpass NXT	acetochlor	15
	AAtrex	atrazine	5
Kochiavore	2,4-D	2,4-D	4
	Starane	fluroxypyr	4
Kyro	Maestro	bromoxynil	6
	Harness	acetochlor	15
OpenSky	Impact	topramezone	27
	Stinger	clopyralid	4
Panoflex	Powerflex	pyroxulam	2
	Starane	fluroxypyr	4
PerfectMatch	Harmony Express	thifensulfuron tribenuron	2
	Powerflex	pyroxulam	2
Perpetuo	Stinger	clopyralid	4
	Starane	fluroxypyr	4
Pixxaro EC	Resource	flumiclorac	14
	Zidua	pyroxasulfone	15
Prefix	Elevore	halauxifen-methyl	4
	Starane	fluroxypyr	4
Quelex	Flexstar	fomesafen	14
	Dual Magnum	S-metolachlor	15
Resicore XL	-----	florasulam	2
	Elevore	halauxifen-methyl	4
Restraint	Harness	acetochlor	15
	Callisto	mesotrione	27
Revulin Q	Stinger	clopyralid	4
	Shieldex	tolpyralate	27
Rezuvant	Accent Q	nicosulfuron	2
	Callisto	mesotrione	27
Sentrallas	Elevore	halauxifen-methyl	4
	Starane	fluroxypyr	4
Sequence	Dual II Magnum	S-metolachlor	15
	Roundup	glyphosate	9
Sinate	Liberty	glufosinate	10
	Impact	topramezone	27
Spartan Charge	Spartan	sulfentrazone	14
	Aim	carfentrazone	14
Starane Flex	-----	florasulam	2
	Starane	fluroxypyr	4
Starane NXT	Starane	fluroxypyr	4
	Buctril	bromoxynil	6
Status	Clarity	dicamba	4
	-----	diflufenzopyr	19
Steadfast Q	Accent Q	nicosulfuron	2
	Resolve	rimsulfuron	2
Storen	Dual II Magnum	S-metolachlor	15
	Callisto	mesotrione	27
	Zidua SC	pyroxasulfone	15
	Optogen	bicyclopyrone	27
Storm	Basagran	bentazon	6
	Ultra Blazer	acifluorfen	14
Supremacy	Harmony Express	thifensulfuron tribenuron	2
	Starane	fluroxypyr	4
SureStart II or TripleFLEX II	Python	flumetsulam	2
	Stinger	clopyralid	4
Surveil	Harmony	thifensulfuron	2
	Express	tribenuron	2
Talinor	Starane	fluroxypyr	4
	Optogen	bicyclopyrone	27
Tavium	Buctril	bromoxynil	6
	Optogen	bicyclopyrone	27
Varisto	Xtendimax	dicamba	4
	Dual Magnum	s-metolachlor	15
Verdict	Beyond Xtra	imazamox	2
	Basagran	bentazon	6
Vios FX	Sharpen	saflufenacil	14
	Outlook	dimethenamid-P	15
Weld	Varro	thiencarbazon	2
	Starane	fluroxypyr	4
WideMatch	MCPA	MCPA	4
	Starane	fluroxypyr	4
WideARMatch	Stinger	clopyralid	4
	Starane	fluroxypyr	4
Wolverine Advanced	Elevore	halauxifen-methyl	4
	Starane	fluroxypyr	4
Zidua Pro	Tacoma	fenoxaprop-P ethyl	1
	-----	pyrasulfotole	27
Zidua Pro	Buctril	bromoxynil	6
	Zidua	pyroxasulfone	15
Zidua Pro	Sharpen	saflufenacil	14
	Pursuit	imazethapyr	2



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