Herbicide Classification by Mode of Action (MOA) for Common Range and Pasture Herbicides

Repeated use of herbicides with the same mode of action (MOA) can result in the evolution of herbicide-resistant weed populations. This chart groups herbicides by their MOA to assist you in selecting herbicides. Consider including nonchemical management strategies and rotate and tank-mix effective herbicides with different modes of action to delay the development of herbicide resistance. Consider herbicide modes of action in range and pasture especially when targeting annual weed species and species with a history of herbicide resistance.

MOA GROUP	MODE/SITE OF ACTION	RESISTANT SPECIES[1]	CHEMICAL FAMILY	ACTIVE INGREDIENT	TRADE NAME[2]
Amino Acid Synthesis Inhibitors					
2	**ALS Inhibitors**	53	Imidazolinone	imazapic	***Plateau***
				imazapyr	***Arsenal***
			Sulfonylurea	chlorsulfuron	***Telar***
				halosulfuron	***Sandea***
				metsulfuron	***Escort***
				rimsulfuron	***Matrix***
				sulfosulfuron	***Outrider***
				triasulfuron	***Amber***
9	**EPSP Synthase Inhibitors**	17	Glycine	glyphosate	***Roundup***
Growth Regulators					
4	**Synthetic Auxins**	10	6-Arylpicolinates	florpyrauxifen	Component of ***DuraCor/HighNoon***
			Benzoate	dicamba	***Clarity***
			6-Chloropicolinates	aminopyralid	***Milestone***
				aminocyclopyrachlor	***Method***
				clopyralid	***Stinger***
				picloram	***Tordon***
			Phenoxy carboxylate	2,4-D	***Various***
				MCPA	***Various***
			Pyridyloxy carboxylate	fluroxypyr	***Starane, Vista***
				triclopyr	***Remedy***
			Quinoline carboxylate	quinclorac	***Facet, Paramount***
19	**Auxin Transport Inhibitor**	0	Aryl carboxylate	diflufenzopyr	Component of ***Overdrive***
Photosynthesis Inhibitors					
5	**Photosystem II Inhibitors**	28	Urea	tebuthiuron	***Spike***
Cell Membrane Disrupters					
14	**PPO Inhibitors**	5	N-Phenyl imide	carfentrazone	***Aim***
				saflufenacil	***Sharpen***
Seedling Root Growth Inhibitors					
3	**Microtubule Assembly Inhibitors**	6	Dinitroaniline	pendimethalin	***Prowl***
Seedling Shoot Growth Inhibitors					
29	**Cellulose Biosynthesis Inhibitors**	1	Aklylazine	indaziflam	***Rejuva***

by PREMIX

PREMIX PRODUCT	ACTIVE INGREDIENT[3]	TRADE NAME[2]	MOA GROUP
Capstone	aminopyralid	***Milestone***	4
	triclopyr amine	***Garlon 3A***	4
Chaparral	aminopyralid	***Milestone***	4
	metsulfuron	***Escort***	2
Cimarron Max	dicamba	***Clarity***	4
	metsulfuron	***Escort***	2
	2,4-D amine	***Various***	4
Cimarron Plus	chlorsulfuron	***Telar***	2
	metsulfuron	***Escort***	2
Confront	clopyralid	***Stinger***	4
	triclopyr amine	***Garlon 3A***	4
Crossbow	triclopyr ester	***Remedy Ultra***	4
	2,4-D ester	***Various***	4
Curtail	clopyralid	***Stinger***	4
	2,4-D amine	***Various***	4
DuraCor, HighNoon	aminopyralid	***Milestone***	4
	florpyrauxifen	Component of ***DuraCor, HighNoon***	4
GrazonNext	aminopyralid	***Milestone***	4
	2,4-D amine	***Various***	4
Grazon P+D	picloram	***Tordon***	4
	2,4-D amine	***Various***	4

PREMIX	ACTIVE INGREDIENT[3]	TRADE NAME[2]	MOA GROUP
GrazonPD3	picloram	***Tordon***	4
	2,4-D choline	***Freelexx***	4
MezaVue	aminopyralid	***Milestone***	4
	fluroxypyr	***Starane, Vista***	4
	picloram	***Tordon***	4
Overdrive	dicamba	***Clarity***	4
	diflufenzopyr	Component of ***Overdrive***	19
PastureGard	fluroxypyr	***Starane, Vista***	4
	triclopyr	***Remedy Ultra***	4
Scorch	dicamba	***Clarity***	4
	fluroxypyr	***Starane, Vista***	4
	2,4-D ester	***Various***	4
Sendero	aminopyralid	***Milestone***	4
	clopyralid	***Stinger***	4
Surmount	fluroxypyr	***Starane, Vista***	4
	picloram	***Tordon***	4
WeedMaster	dicamba	***Clarity***	4
	2,4-D amine	***Various***	4
Yukon	dicamba	***Clarity***	4
	halosulfuron	***Sandea***	2

[1]Herbicide-resistant (HR) weed species by MOA. Common HR weeds in western US range and pasture include cheatgrass, the pigweeds, horseweed, kochia, prickly lettuce, Russian thistle, Italian ryegrass, wild oats, and others. [2]List of product example/trade name not exhaustive. [3]Certain synthetic auxin herbicides are available in different formulations that can influence performance. This document was developed by W. Curran, GROW Outreach Team/Penn State University and relied on information and design from *Take Action Herbicide Resistance Management* (https://iwilltakeaction.com/).

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