TEXAS A&M AGRILIFE EXTENSION

A Quick Guide to Herbicide Modes of Action

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Introduction

Chemical weed control can be a difficult task. New products, new formulations, premixes, and generic herbicides are continually being introduced. This guide is designed to help simplify your decisions regarding herbicide products.

The way that a herbicide controls susceptible plants is referred to as its "mode of action." The Weed Science Society of America (WSSA) has developed numbering system for classifying the mode of action of herbicides into groups. Often, you will see this group number on herbicide labels. In this guide, many commonly-used herbicides are grouped together by their mode of action and group number.

In recent years, many weed species have become resistant to certain herbicides, further complicating weed control efforts. Additionally, many herbicide resistant weeds are "cross-resistant" to other active ingredients with the same mode of action. Many of these resistant weed problems have developed due to an over-reliance on a single herbicide mode of action. In order to combat these resistant weeds, different herbicide modes of action must be used. By using this guide, you can keep track of the modes of action that you use. As always, make sure to read and follow the instructions found on the product label.

How to Use this Guide

In the upper left corner of each mode of action's page, you will find the WSSA group numbers for those herbicides. Below that is a short description of that mode of action as well as a few of the most common herbicide trade names and active ingredients that you may encounter.

On the opposite page you will find a blank table where you can write down additional herbicide names that belong to that group. This will help you keep track of the mode of action of new herbicides as well as generics.

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1

Lipid Synthesis Inhibitors

These herbicides are "grass-killers" that block the first step in fatty acid synthesis. This disruption prevents the formation of lipid membranes in plant cells.

Herbicide Group	Trade Names	Active Ingredients
1	Assure II	quizalofop
	Hoelon	diclofop
	Fusilade	fluazifop
	Puma	fluazifop
	Select, Select Max, others	clethodim
	Poast, Poast Plus,	sethoxydim
	Axial XL	pinoxaden

Additional Group 1 Herbicides	
Trade Name	**Active Ingredient**

2

ALS Inhibitors

These herbicides bind to an enzyme involved in the production of vital branch-chain amino acids in plants. Without these amino acids, the plant eventually dies.

Herbicide Group	Trade Names	Active Ingredients
2	Beyond, Raptor	imazamox
	Cadre, Plateau	imazapic
	Pursuit	imazethapyr
	Scepter	imazaquin
	Accent	nicosulfuron
	Ally	metsulfuron
	Amber	triasulfuron
	Beacon	primisulfuron
	Classic	chlorimuron
	Express	tribenuron
	Glean, Telar	chlorsulfuron
	Harmony	thifensulfuron
	Maverick	sulfosulfuron
	Permit	halosulfuron
	Resolve	rimsulfuron
	FirstRate	cloransulam-methyl
	Strongarm	diclosulam
	Staple	pyrithiobac

Additional Group 2 Herbicides	
Trade Name	**Active Ingredient**

3

Root Growth Inhibitors

Herbicides in Group 3 interrupt cell division in roots of newly germinating seedlings. This halts root growth, preventing plants from emerging from the soil.

Herbicide	Trade Names	Active Ingredients
3	Treflan	trifluralin
	Prowl, others	pendimethalin
	Sonalan	ethafluralin
	Balan	benefin

Additional Group 3 Herbicides	
Trade Name	**Active Ingredient**

4

Growth Regulators

These broadleaf-selective herbicides mimic naturally -occurring plant hormones, causing hormonal imbalances. These imbalances disrupt several critical processes within the plant.

Herbicide Group	Trade Names	Active Ingredients
4	Many	2,4-D
	Butyrac, others	2,4-DB
	Many	MCPA
	Banvel, Clarity, Status, others	dicamba
	Stinger, Reclaim	clopyralid
	Starane	fluroxypyr
	Tordon	picloram
	Paramount	quinclorac

Additional Group 4 Herbicides	
Trade Name	**Active Ingredient**

5 6 7

Photosystem II Inhibitors

Herbicides in Groups 5, 6, and 7 inhibit photosynthesis, the process that all plants use to convert sunlight into sugars.

Herbicide Groups	Trade Names	Active Ingredients
5	AAtrex, Atrazine, others	atrazine
	Princep	simazine
	Caparol	prometryn
	Sencor	metribuzin
	Velpar	hexazinone
	Sinbar	terbacil
6	Buctril, others	bromoxynil
	Basagran	bentazon
7	Linex, Lorox	linuron
	Karmex, Direx	diuron
	Cotoran	fluometuron
	Spike	tebuthiuron

Additional Group 5, 6, and 7 Herbicides	
Trade Name	**Active Ingredient**

8 15

Shoot Growth Inhibitors

These herbicides disrupt the growth of small-seeded grass and broadleaf plants before they emerge from the soil.

Herbicide Groups	Trade Names	Active Ingredients
8	Eptam	EPTC
15	Dual, Cinch, others	metolachlor
	Intrro, Micro-Tech	alachlor
	Harness, Degree, War-rant, others	acetochlor
	Outlook	dimethenamid-P
	Define	flufenacet

Additional Group 8 and 15 Herbicides	
Trade Name	**Active Ingredient**

12 13 27

Pigment Synthesis Inhibitors

These herbicides destroy the green pigment in plant tissues, causing a “bleaching” of leaves. Without this pigment, plants cannot carry out photosynthesis.

Herbicide Groups	Trade Names	Active Ingredients
12	Zorial	norflurazon
13	Command	clomazone
27	Callisto	mesotrione
	Laudis	tembotrione
	Impact	topramezone
	Balance	isoxaflutole

Additional Group 12, 13, and 27 Herbicides	
Trade Name	**Active Ingredient**

9

Aromatic Amino Acid Synthesis Inhibitors

This herbicide (glyphosate) inhibits the production of the amino acids tryptophan, tyrosine, and alanine. Without these amino acids, plant death occurs

Herbicide Group	Trade Names	Active Ingredients
9	Roundup, Touchdown, others	glyphosate

10

Glutamine Synthetase Inhibitors

This herbicide (glufosinate) halts the activity of the enzyme glutamine synthetase, resulting in a lethal accumulation of ammonia within plant cells.

Herbicide	Trade Names	Active Ingredients
10	Liberty, Ignite	glufosinate

Additional Group 9 Herbicides	
Trade Name	**Active Ingredient**

Additional Group 10 Herbicides	
Trade Name	**Active Ingredient**

14

PPG Oxidase Inhibitors

These herbicides inhibit the enzyme protoporphyrinogen oxidase, leading to an accumulation of harmful radicals in plant tissues. These radicals attack lipids and proteins resulting in damage to cellular membranes.

Herbicide Group	Trade Names	Active Ingredients
	Blazer	acifluorfen
	Reflex, Flexstar	fomesafen
	Cobra	lactofen
	Goal	oxyfluorfen
14	Valor	flumioxazin
	Resource	flumiclorac
	Cadet	fluthiacet
	Aim	carfentrazone
	Spartan, Authority	sulfentrazone

Additional Group 14 Herbicides	
Trade Name	**Active Ingredient**

22

Photosystem I Inhibitors

Herbicides of this group result in the production of damaging superoxides and hydrogen peroxide, which rapidly destroy cell membranes.

Herbicide Group	Trade Names	Active Ingredients
22	Gramoxone, others	paraquat
	Reglone	diquat

Additional Group 22 Herbicides	
Trade Name	**Active Ingredient**

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