

Making Sense of Herbicides

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Herbicides are a type of pesticide used to control unwanted plants in areas where more desirable plants like ornamentals and turfgrass species are grown. Not all herbicides are the same, making it necessary to first understand how weeds are classified, how they spread, and what herbicides are safe to use around desired plants, to select the best control option.

Weeds are generally defined as ‘a plant out of place,’ but only about 200 of the 8,000 or so “weedy” plants worldwide are considered noxious and/or invasive. Some characteristics of weeds include:

- Abundant seed production;
- Ability to establish in highly disturbed areas;
- Ability to reproduce through vegetative structures such as root or stem fragments;
- Long-term seed dormancy and survivability.

Weedy plants are classified into three general categories based on their life cycles:

- **Annual weeds;** these are plants that complete their life cycle in one growing season and do not survive via a dormant root system. Annual weeds are either *summer annuals* which germinate in the spring and die in the fall, or *winter annuals* which germinate in the fall and die in the spring.
- **Biennial weeds;** plants that germinate and produce a basal rosette in the first year, then complete their life cycle the following season.
- **Perennial weeds;** plants that are longer-lived and survive via underground root systems and/or seed production.



Figure 1. Gray cudweed (*Gnaphalium* sp.) is a biennial weed that emerges in early fall as a basal rosette with grayish undersides.

Before utilizing herbicides as a control option, consider alternative strategies such as hand-pulling, hoeing, cultivation, or physical barriers like natural and synthetic (plastic) mulches. If you decide to use chemical herbicides, make sure the weed has been correctly identified by a trusted resource. Your local county extension center will have staff on hand who are familiar with many common weeds and their control.

Herbicides are classified several ways, but for this publication they are grouped as follows:

- **Pre-emergent:** *must be applied before weed seeds germinate.* These products are often sold as crabgrass preventers, but are effective in controlling other summer annual grassy weeds like sandbur and goosegrass. Pre-emergent herbicides will have no effect on winter weeds, on weeds that are already growing, or on perennial weeds. Most pre-emergent products are in granular formulations and should be watered in immediately following application.

- **Post-emergent:** *applied after weeds are actively growing.* These products are contact or systemic in nature, and are used to control a variety of broadleaf, grass, and sedge-type weeds. Most post-emergent products can only be used in certain warm-season lawn types and few can be used in ornamental beds.
- **Selective:** these herbicides can be safely used to control certain weed species without causing harm to other plants nearby. Most turfgrass herbicides are selective.
- **Nonselective:** herbicides that kill all plants regardless of species. Use these products as spot treatments when targeting individual weeds.

Read the label, know the difference. Choosing the right product can be intimidating. While there are many *brand names* from which to choose, there are fewer active ingredients available in herbicide products labeled for use in home landscapes. *Active ingredients* (AI) are the chemicals in an herbicide that kill or control the target weed while *brand names* are how companies distinguish their products; thus, when choosing a product, make sure you are choosing the right *active ingredient*.

Besides knowing the active ingredient, it is necessary to know where, when, and how a particular product can be applied. For example, weeds such as crabgrass begin to germinate when soil temperatures reach around 55 degrees F, which means pre-emergent herbicides must be applied shortly around that time to increase efficacy. If you cannot measure soil temperature, a general rule of thumb is to apply pre-emergent herbicides around the time dogwoods begin to bloom.

Before using any pesticide, take uninterrupted time to read the label. It is critical to read the label carefully before using any pesticide, as the label contains vital information on how to mix, apply, store, and dispose of that product, protecting you, your family, and the environment. *Using a pesticide in a manner that is inconsistent with the label is a violation of federal law.*

Wipe-Out Herbicide

Post-emergent herbicide for control of grassy weeds like crabgrass, goosegrass, and sandburs in public, commercial, and residential turfgrass.

Active ingredients:

Monosodium acid methanesulfonate	9.81%
2,4-D, dimethylamine salt	3.18%
Mecoprop-p, dimethylamine salt	1.80%
Dicamba, dimethylamine salt	0.79%
<hr/>	
Other Ingredients	84.42%
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Total:	100.00%

**KEEP OUT OF REACH OF CHILDREN.
CAUTION**

See additional precautionary statements and directions for use inside booklet.

Net contents 1 gal.

THIS LABEL FOR EDUCATIONAL PURPOSES ONLY.

Figure 2. Herbicide label example.

Pre-emergent herbicides

Active Ingredient	Brand Name	Type of weeds controlled
<i>Atrazine (pre and post-emergent weed control)</i>	<ul style="list-style-type: none"> • Hi-Yield Atrazine weed killer • Image for St. Augustine and Centipede grass • Southern Ag Atrazine • Spectracide Weed Stop (St. Augustine and Centipede) 	<ul style="list-style-type: none"> • Annual bluegrass, chickweed, cudweed, florida betony, dollarweed, and more.
Dichlobenil	<ul style="list-style-type: none"> • Casoron 4G 	<ul style="list-style-type: none"> • Annual bluegrass, many broadleaf weeds. See label for full list of weeds controlled.
Dithiopyr	<ul style="list-style-type: none"> • Dimension 2EW • Dimension 40WP • Duraturf Crabgrass and Weed Preventer • Hi-Yield Turf and Ornamental Weed and Grass Stopper 	<ul style="list-style-type: none"> • Annual bluegrass, crabgrass, goosegrass, chickweed, purslane, spotted spurge, and more.
Isoxaben	<ul style="list-style-type: none"> • Gallery • QualiPro Isoxaben 	<ul style="list-style-type: none"> • Broadleaf weeds
<i>Mesotrione (Pre- and post-emergent weed control)</i>	<ul style="list-style-type: none"> • Tenacity 	<ul style="list-style-type: none"> • Broadleaf and grassy weeds, nutsedges, see individual label for full list of weeds controlled.
Oryzalin	<ul style="list-style-type: none"> • Surflan AS 	<ul style="list-style-type: none"> • Crabgrass, pigweed, chickweed, spurge, yellow woodsorrel
Trifluralin	<ul style="list-style-type: none"> • Hi-Yield Herbicide Granules • Monterey Veggie and Ornamental Weeder 	<ul style="list-style-type: none"> • Annual bluegrass, crabgrass, sandbur, chickweed, and more. See individual label for full list of weeds controlled.

Post-emergent herbicides

Active Ingredient	Brand Name	Type of weeds controlled
2,4-D	<ul style="list-style-type: none"> • Gordon's Amine 400 • LV400 • Southern Ag 2,4-D Weed Killer • Tiger Brand Lawn Weed Killer • Hi-Yield 2,4-D Selective 	<ul style="list-style-type: none"> • Broadleaf weeds, see individual label for list of all weeds controlled.
2,4-D + dicamba + quinclorac	<ul style="list-style-type: none"> • Bayer Advanced All-in-one Lawn Weed and Crabgrass Killer 	<ul style="list-style-type: none"> • Crabgrass, most broadleaf weeds, see individual labels for list of all weeds controlled.
2,4-D + propionic acid + dicamba	<ul style="list-style-type: none"> • Gordon's Trimec 899 Broadleaf Herbicide 	<ul style="list-style-type: none"> • Many broadleaf weeds, see individual label for list of all weeds controlled.
2,4-D + 2,4-DP + dicamba	<ul style="list-style-type: none"> • Brushmaster 	<ul style="list-style-type: none"> • Poison ivy, kudzu, and other woody vegetation, and listed broadleaf weeds.
2,4-D + dicamba	<ul style="list-style-type: none"> • Trimec 922 	<ul style="list-style-type: none"> • Many broadleaf weeds, see individual label for list of all weeds controlled.
2,4-D + 2,4-DP + dicamba	<ul style="list-style-type: none"> • Super Trimec 	<ul style="list-style-type: none"> • Many broadleaf weeds, see individual label for list of all weeds controlled.
2,4-D + dicamba + propionic acid	<ul style="list-style-type: none"> • Trimec Southern 	<ul style="list-style-type: none"> • Many broadleaf weeds, see individual label for list of all weeds controlled.
2,4-D + mecoprop	<ul style="list-style-type: none"> • Scotts Turf Builder Weed-n-Feed 	<ul style="list-style-type: none"> • Many broadleaf weeds, see individual label for list of all weeds controlled.
2,4-D + mecoprop + dicamba	<ul style="list-style-type: none"> • Bayer Season Long Weed Control • Bonide Weed Beater • Ortho Weed B Gon • Spectracide Weed Stop for Lawns • Weed-out Broadleaf 	<ul style="list-style-type: none"> • Many broadleaf weeds, see individual label for list of all weeds controlled.
2,4-D + mecoprop + dicamba + carfentrazone	<ul style="list-style-type: none"> • Ferti-lome Weed Free Zone • Speedzone • Speedzone Southern 	<ul style="list-style-type: none"> • Many broadleaf weeds, see individual label for list of all weeds controlled.
2,4-D + mecoprop + dichlorprop	<ul style="list-style-type: none"> • Scott's Liquid Turf Builder with Plus 2 Weed Control 	<ul style="list-style-type: none"> • Many broadleaf weeds, see individual label for list of all weeds controlled.
2,4-D + triclopyr	<ul style="list-style-type: none"> • Crossbow 	<ul style="list-style-type: none"> • Many broadleaf weeds, see individual label for list of all weeds controlled.
Ammonium nonaoate*	<ul style="list-style-type: none"> • Mirmichi Green 	<ul style="list-style-type: none"> • Many broadleaf and grassy weeds, see individual label for list of all weeds controlled. OMRI Approved

Post emergent herbicides (cont.)

Carfentrazone	<ul style="list-style-type: none"> • Quicksilver 	<ul style="list-style-type: none"> • Many broadleaf weeds, see individual label for list of all weeds controlled.
Corn gluten	<ul style="list-style-type: none"> • Espoma Weed Preventer • MAIZE Weed Preventer RTS 	<ul style="list-style-type: none"> • Many broadleaf weeds, crabgrass, annual bluegrass.
Dicamba + metsulfuron	<ul style="list-style-type: none"> • Farenheit 	<ul style="list-style-type: none"> • Annual and perennial broadleaf weeds and grass.
Diquat + pluazilot + dicamba	<ul style="list-style-type: none"> • Spectracide Weed and Grass Killer 	<ul style="list-style-type: none"> • Many broadleaf and grassy weeds, see product label for full list of weeds controlled.
Fenoxaprop	<ul style="list-style-type: none"> • Acclaim Extra 	<ul style="list-style-type: none"> • Crabgrass, panic grass, sandburs, Japanese stiltgrass
Flazasulfuron	<ul style="list-style-type: none"> • Katana 	<ul style="list-style-type: none"> • Crabgrass, dandelion, nutsedge, white clover, more.
Florasulam	<ul style="list-style-type: none"> • Defendor 	<ul style="list-style-type: none"> • Chickweed, dollarweed, dandelion, more.
Fluazifop-p-butyl	<ul style="list-style-type: none"> • Fusilade II • Ornamec Over-the-top 	<ul style="list-style-type: none"> • Crabgrass, goosegrass, many broadleaf weeds.
Foramsulfuron	<ul style="list-style-type: none"> • Revolver 	<ul style="list-style-type: none"> • Ryegrass, annual bluegrass, henbit, doveweed
Glyphosate	<ul style="list-style-type: none"> • <i>Many products available</i> 	<ul style="list-style-type: none"> • Broadleaf and grassy weeds, see individual label for full list of weeds controlled.
Glyphosate + diquat	<ul style="list-style-type: none"> • Roundup Weed and Grass Killer Plus 	<ul style="list-style-type: none"> • Broadleaf and grassy weeds, see individual label for full list of weeds controlled.
Glyphosate + diquat + imazapic	<ul style="list-style-type: none"> • Roundup Extended Control 	<ul style="list-style-type: none"> • Broadleaf and grassy weeds, see individual label for full list of weeds controlled.
Glyphosate + imazapic	<ul style="list-style-type: none"> • Roundup Max Control 365 	<ul style="list-style-type: none"> • Broadleaf and grassy weeds, see individual label for full list of weeds controlled.
Glyphosate + imazapyr	<ul style="list-style-type: none"> • Ground Force Vegetation Killer • Ortho Ground Clear 	<ul style="list-style-type: none"> • Broadleaf and grassy weeds, see individual label for full list of weeds controlled.
Glyphosate + triclopyr	<ul style="list-style-type: none"> • Roundup Poison Ivy 	<ul style="list-style-type: none"> • Broadleaf and grassy weeds, see individual label for full list of weeds controlled.
Halosulfuron	<ul style="list-style-type: none"> • Hi-Yield Nutsedge and Horsetail • Prosedge 	<ul style="list-style-type: none"> • Yellow and purple nutsedge, horsetail
Imazaquin	<ul style="list-style-type: none"> • Image (for Nutsedge) 	<ul style="list-style-type: none"> • Yellow and purple nutsedge

Post emergent herbicides (cont.)

MCPA + trimethylamine + dicamba	<ul style="list-style-type: none"> Bonide Poison Ivy and Brush Killer 	<ul style="list-style-type: none"> Henbit, dandelion, poison ivy, and more. See individual label for full list of weeds controlled.
MCPA + MCPP + Dicamba + Carfentrazone	<ul style="list-style-type: none"> Bonide Weed Beater Ultra 	<ul style="list-style-type: none"> Spurge, dollarweed, dandelion, and more. See individual label for full list of weeds controlled.
Mecoprop + 2,4-D + Dicamba	<ul style="list-style-type: none"> Trimec Lawn Weed Killer 	<ul style="list-style-type: none"> Many broadleaf weeds; see individual label for full list of weeds controlled.
Metsulfuron + pyraflufen	<ul style="list-style-type: none"> Caliente 	<ul style="list-style-type: none"> Many broadleaf and grassy weeds, and more. See individual label for full list of weeds controlled.
Metsulfuron	<ul style="list-style-type: none"> Quali-Pro MSM 	<ul style="list-style-type: none"> Dandelion, dollarweed, bahiagrass, chickweed, and more. See individual label for full list of weeds controlled.
Metsulfuron + rimsulfuron	<ul style="list-style-type: none"> Quali-Pro Negate 37WG 	<ul style="list-style-type: none"> Annual bluegrass, dandelion, chickweed, spurge, and more. See individual label for full list of weeds controlled.
Pelargonic acid + related fatty acids	<ul style="list-style-type: none"> Scythe 	<ul style="list-style-type: none"> Annual and perennial grasses; annual and perennial broadleaf weeds; most mosses
Penoxsulam	<ul style="list-style-type: none"> Fertilome Dollarweed Control 	<ul style="list-style-type: none"> Chickweed, clovers (hop, red, and white), dollar weed, lespedza, and more. See individual label for full list of weeds controlled.
Penoxsulam + sulfentrazone + 2,4-D + dicamba	<ul style="list-style-type: none"> Roundup for Southern Lawns 	<ul style="list-style-type: none"> Dollarweed, dandelion, clover, yellow nutsedge, chickweed, and more. See individual label for full list of weeds controlled.
Prodiamine + sulfentrazone	<ul style="list-style-type: none"> Bonide Sedge Ender 	<ul style="list-style-type: none"> Sedges, crabgrass, many broadleaf weeds. See individual label for full list of weeds controlled.
Quinclorac + sulfentrazone + 2,4-D + dicamba	<ul style="list-style-type: none"> Q4 Plus Turf Herbicide 	<ul style="list-style-type: none"> Chickweed, clovers, crabgrass, yellow nutsedge, and more. See individual label for full list of weeds controlled.
Sethoxydim	<ul style="list-style-type: none"> Bonide Grass Beater Fertilome Over the Top II Grass Killer Hi-Yield Grass Killer 	<ul style="list-style-type: none"> Annual and perennial grass weeds.

Sulfentrazone	<ul style="list-style-type: none"> Dismiss NXT Ortho Nutsedge Killer 	<ul style="list-style-type: none"> Broadleaf weeds, yellow and purple nutsedges. See individual label for full list of weeds controlled.
Sulfentrazone + imazethapyr	<ul style="list-style-type: none"> Dismiss South 	<ul style="list-style-type: none"> Chickweed, crabgrass, clover, dandelion, nutsedge, spurge, and more.
Sulfentrazone + metsulfuron	<ul style="list-style-type: none"> Blindside 	<ul style="list-style-type: none"> Clover, crabgrass, yellow and purple nutsedge, spurge, and more. See individual label for full list of weeds controlled.
Sulfentrazone + quinclorac	<ul style="list-style-type: none"> Solitare 	<ul style="list-style-type: none"> Purple and yellow nutsedge, clover, dollarweed, spurge, and more. See individual label for full list of weeds controlled.
Sulfosulfuron	<ul style="list-style-type: none"> Certainty 	<ul style="list-style-type: none"> Purple and yellow nutsedge, annual bluegrass, chickweed, and more. See individual label for full list of weeds controlled.
Thiencarbazone-methyl + iodosulfuron-methyl-sodium + dicamba	<ul style="list-style-type: none"> Celsius 	<ul style="list-style-type: none"> Annual and perennial broadleaf weeds and grass. See individual label for full list of weeds controlled.
Triclopyr	<ul style="list-style-type: none"> Bayer Advanced Brush Killer Brush Killer/Stump Killer Ortho Poison Ivy 	<ul style="list-style-type: none"> Brush, vines, poison ivy, kudzu, and more. See individual label for full list of weeds controlled.
Triclopyr + dicamba + MCPA	<ul style="list-style-type: none"> Bonide Chickweed, Clover, and Oxalis Killer 	<ul style="list-style-type: none"> Chickweed, dog fennel, spurge, wood sorrel, and more. See individual label for full list of weeds controlled.
Trifloxysulfuron – sodium	<ul style="list-style-type: none"> Monument 	<ul style="list-style-type: none"> Sedges, annual bluegrass, broadleaf weeds, and more. See individual label for full list of weeds controlled.

Data collection on available herbicides made possible with the efforts of the Brunswick County Extension Master Gardener Volunteers, Class of 2017.

Learn More with these Online Resources!

Extension Master Gardener Handbook:

<https://content.ces.ncsu.edu/extension-gardener-handbook/appendix-b-pesticide-safety>;

NC Cooperative Extension Gardening Portal:

<https://gardening.ces.ncsu.edu/>

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