

A Homeowner's Guide to Herbicide Selection for Warm-Season Turfgrass Lawns

Dr. Becky Grubbs-Bowling*

It can be difficult for homeowners to differentiate between herbicide products available at popular home and garden distributors. This publication was created as an overview of several active ingredients commonly found in widely-available herbicides and simple tips for product selection.

Integrated Weed Management (IWM)

Lawn weeds can often be an indication of other underlying issues compromising turfgrass growth and development. Issues may include environmental stresses—such as shade, drought, or heat—or stresses caused by improper management—including inappropriate mowing, fertilization, or irrigation.

When tackling a weed problem, it is essential to develop a comprehensive weed management program that optimizes chemical control and reduces the risk of future weeds. Before selecting an herbicide product, consider the following:

1. Preventative Control: Take steps to prevent the introduction of new weeds into your lawn via seeds or vegetative structures. For

example, lateral stems such as rhizomes or stolons can root into the soil and establish new plants. Use reliable sources and take care when introducing new seed, sod, sprigs, topsoil, or compost across your lawn. These materials have the potential for contamination. Keep mowers, string trimmers, and similar equipment clean and free of debris to avoid transporting weeds along with the equipment. When weeds are producing seed heads and flowers, bag and remove clippings to prevent weed dispersal.

2. Mechanical Control: Regular mowing and physical removal of weeds by hand-pulling or with hand tools can help reduce weed pressure. Particularly when weeds are more mature, manual removal may be more effective than the use of postemergence herbicides.

3. Cultural Control: Good cultural control involves adopting practices that support healthy, dense turfgrass, which is the best defense against weeds. Proper mowing, irrigation, and fertilization practices are vital in supporting healthy turfgrass growth and reducing overall weed pressure. To learn more about appropriate cultural management, visit the AggieTurf website (<https://aggieturf.tamu.edu>).

* Assistant Professor & Extension Turfgrass Specialist, The Texas A&M University System

Herbicide Selection: Where to Begin?

There are several steps required to determine an optimal herbicide to control weeds in a lawn.

- 1. Proper Weed Identification:** It is critical to accurately identify the target weeds in the lawn as well as the predominant turfgrass species. For weed identification, there are several things to consider including life cycle and morphology.
- 2. Proper Turfgrass Identification:** Products should be selected in accordance with the species of turfgrass on your home lawn. Before selecting a product, it is vital to know what species of turf you have.
- 3. Determining whether a preemergence or postemergence product is most appropriate.** Preemergence and postemergence herbicides are applied at different points in the target weed's life cycle. Before purchasing a product, it is essential to know which type of product to select relative to the application timing. In some cases, it may be appropriate to purchase products containing both pre- and postemergence herbicides.

Step 1: Proper Weed Identification

Start by identifying your primary target weeds. It is particularly important to know how the target weeds are classified relative to their morphology and life cycle. These attributes are outlined below along with several weed examples with photographs. In some cases, there may be dozens of unique weed species present in your landscape. Do not feel overwhelmed. Focus on identifying general trends in the types of weeds present. Questions to consider include: Are there mostly broadleaf weeds or grassy weeds? Are the weeds mostly annuals or perennials? Having a general idea of what you are dealing with will help you select the most effective product for your unique situation.

Weed Morphology

Broadleaf Weeds: These are dicotyledonous plants with netlike veins and usually showy flowers.

Grassy Weeds: These are monocotyledonous plants with parallel (striped) veins that typically do not have showy flowers.

Sedges: These are monocots similar to grasses. They usually have solid, triangular stems and a three-ranked leaf arrangement.

Weed Life Cycles

Annual Weeds germinate from seed each year and live for one growing season. Summer annuals will typically germinate in the spring or early summer and die back in the fall. Winter annuals will normally germinate in the fall or early winter, dying back in the late spring or early summer.

Biennial Weeds typically complete their life cycle over the course of two growing seasons. In the first year, seeds will germinate and produce a rosette. In the second year, they will develop a stalk and begin to flower.

Perennial Weeds may go dormant over the winter and return each year, persisting across multiple seasons. Herbicide application timing will vary by species, as different perennials will be more or less active at different points in the year. Proper identification will help to determine when herbicides should be applied to be the most effective. These weeds are often more challenging to control.

Examples of Common Weeds Found in Texas Turfgrass Areas

In the next section, you will find a small selection of common weeds found in turfgrass areas, including home lawns. These weeds are organized according to their morphology (grassy, broadleaf, or sedge) and their life cycle (annual, biennial, or perennial). For additional images of these and other weeds, visit <https://aggieturf.tamu.edu/turfgrass-weeds/>.

Grassy Weeds

Winter Annual Grassy Weeds



Rescuegrass
Bromus catharticus Vahl



Annual Ryegrass
Lolium multiflorum

Summer Annual Grassy Weeds



Jungle Rice
Echinochloa Colona L.



Goosegrass
Eleusine indica (L.) Gaertn.

Perennial Grassy Weeds



Spring Starflower
Ipheion uniflorum (Lindl.) Raf.



Bahia grass
Paspalum notatum Fleugge



King Ranch ("KR") Bluestem
Bothriochloa ischaemum (L.) Keng



Wild Onion
Allium canadense L.

Broadleaf Weeds

Winter Annual Broadleaf Weeds



Asiatic Hawksbeard
Youngia japonica L.

Summer Annual Broadleaf Weeds



Carpetweed
Mollugo verticillata L.



Lawn Burweed
Soliva sessilis Ruiz & Pavon



Spotted Spurge
Chamaesyce maculata L.

Biennial Broadleaf Weeds



Texas Thistle
Cirsium vulgare (Savi) Ten.



Wild Carrot
Daucus carota L.

Broadleaf Weeds *continued*

Perennial Broadleaf Weeds



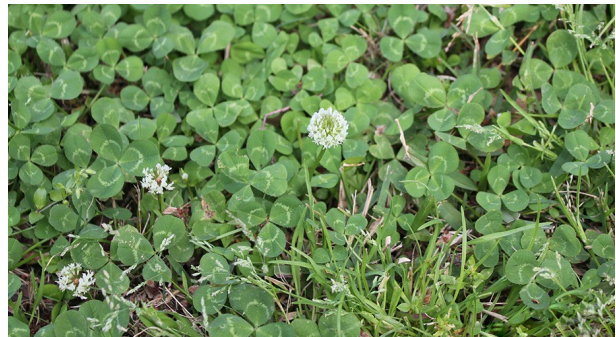
Dollarweed
Hydrocotyle sp.



Carolina Dichondra
Dichondra carolinensis Michx.



Dandelion
Taraxacum officinale F.H. Wigg



White Clover
Trifolium repens L.

Sedge Weeds



Annual Sedge (summer annual)
Cyperus compressus L.



Green Kyllinga (perennial)
Kyllinga brevifolia Rottb.



Yellow Nutsedge (perennial)
Cyperus esculentus L.



Purple Nutsedge (perennial)
Cyperus rotundus L.

Step 2. Know Which Species of Turfgrass are Present on Your Lawn

Many herbicide products will be more or less appropriate for your lawn based on the species of turfgrass that you have. It is also beneficial to know the cultivar or variety of turfgrass that you have. Select products may not be safe to use on all cultivars of a species. A common example of a cultivar that may be more sensitive to select herbicides is Floratam St. Augustinegrass.

Table 1 lists select warm-season turfgrass species commonly found in Texas lawns. For more information about individual species or species not listed here—including cool-season turfgrass species like tall fescue, perennial ryegrass, or Kentucky bluegrass—visit <https://aggieturf.tamu.edu/>.

Table 1. Select Warm-Season Turfgrasses Found in Texas Home Lawns

Common Name	Scientific Name
Bermudagrass (Common or Hybrid)	<i>Cynodon dactylon</i> L.
Zoysiagrass (Coarse or Fine)	<i>Zoysia</i> spp.
St. Augustinegrass	<i>Stenotaphrum secundatum</i> (Walt.) Kuntze
Buffalograss	<i>Bouteloua dactyloides</i>
Centipedegrass	<i>Eremochloa ophiuroides</i> (Munro) Hack.

Step 3: Choosing a Preemergence or Postemergence Product

Preemergence herbicides are products designed to prevent seedling emergence and development. They are best applied before seed germination. For this reason, these products are often most effective on annual weeds. In Texas, these products are typically applied to lawns twice a year, once in the spring and again in the fall.

In the spring, preemergence herbicides are often applied when soil temperatures are between 50

and 55 °F. This is the soil temperature range in which several summer annual weeds—including crabgrass (*Digitaria* spp.)—begin to germinate. This benchmark temperature is often reached between mid-February and mid-March.

Optimal fall application timing can be more difficult to pinpoint and will vary from year to year. In general, most fall preemergence applications are made between late August and October. More northern parts of Texas will generally need to apply these products earlier in the year compared to southern parts of the state. More southern parts of the state may also benefit from split-applications of preemergence herbicides. In split-applications, the total rate is divided in half. The first half of the application is made around October while the other half is made around December or January. This is due to the warmer temperatures in southern Texas that often lead to continued weed germination throughout the winter months.

It is important to always follow label instructions regarding appropriate timing for application of preemergence herbicides. Some preemergence products will temporarily injure turfgrass when applied at certain times of the year. Additionally, use caution when planning to overseed your lawn, as preemergence products can inhibit successful germination of new grass seed. Follow label recommendations with respect to timing. Some products will specify a window for applying a product both before and after overseeding.

Postemergence herbicides are generally going to be much more effective when applied earlier in a target weed's life cycle. As weeds mature and grow, product uptake and movement within the weed becomes more limited. It is important to scout judiciously for new weeds during transition periods in the spring, early summer, and fall. In some cases, it may be appropriate to apply pre- and postemergence herbicide products simultaneously for best results.

Note: Many herbicide products are labeled for use on established turfgrass only. Read the label and follow instructions for appropriate use to prevent injury to newly-planted turfgrass. While sodded turfgrass may be considered established within 3–6 months of planting, seeded and sprigged areas are often not considered established until a full year after planting.

Spot Spray or Broadcast Application?

For postemergence applications, you must determine whether to apply herbicides as a spot treatment or as a broadcast application. In spot treatments, the herbicide is applied to individual weeds—not the entire lawn. Some of these products (e.g., “Ready-To-Use”) are exclusively designed for this purpose and should not be purchased if a broadcast application is desired.

Conversely, broadcast applications are performed to cover an entire lawn for broad-spectrum weed control. This method is often recommended early in the season when immature weeds begin emerging across a landscape. Broadcast applications will often require specialized equipment—such as a rotary spreader—to apply the product uniformly and at the appropriate rate.

Other Key Terms

Selective Herbicides are designed to control specific weeds without harming the target crop (turfgrass). Most products are generally classified for “broadleaf” or “grassy weed” control. However, several products can selectively control both broadleaf and grassy weeds in turfgrass. Examples of selective herbicides are listed in Tables 2 and 3.

Table 2. Common Active Ingredients Found in Preemergence Herbicides for Lawn Management

Active Ingredient	Target Weeds	Found in Products Like	Notes
Corn Gluten Meal	grasses	Green It Liquid Corn Gluten Weed Preventer, Preen Natural Weed Preventer, Others	This organic option may not be as effective as other products listed below.
Dithiopyr	grasses, some broadleaf weeds	Sta-Green CRAB-EX Crabgrass Control, Bonide Crabgrass Preventer, Others	This can provide some early postemergence crabgrass control.
Isoxaben	grasses, some broadleaf weeds	Fertilome Broadleaf Weed Control with Gallery; Snapshot Granular Preemergent; BioAdvanced Season Long Weed Control, Others	It can be combined with grassy weed preemergence herbicides to broaden the spectrum of weed control.
Oryzalin	grasses, some broadleaf weeds	Monterey Weed Impede, Green Light Amaze Grass & Weed Preventer, Surflan Herbicide	This herbicide thins overseeded grass.
Pendimethalin	grasses, some broadleaf weeds	Scotts Halts Crabgrass Preventer, Others	This product should be activated by rainfall or irrigation before weeds germinate. Follow label recommendations.
Prodiamine	broadleaf weeds	NutriScape Crabgrass Preemergent Prodiamine, Others	It can stain concrete areas. Use caution when applying to these areas. This product should be activated by rainfall or irrigation before weeds germinate. Follow label recommendations.

Table 3. Common Active Ingredients Found in Postemergence Herbicides for Lawn Management

Active Ingredient	Target Weeds	Turfgrass Species Tolerance Rating*							Found in Products Like	Notes
		BE	BU	CE	SA	SA	Z	Z		
2,4-D	Broadleaf Weeds	T	C	NR	C	C	T	T	Often used in combination with other active ingredients like dicamba or MCPP. (Weed B Gon, Weed Stop, RoundUp for Lawns)	Injury is more likely on Buffalograss, St. Augustinegrass, and Centipedegrass lawns. Refer to the label. Do not overapply. It is generally not recommended that products containing 2,4-D be applied to buffalograss in temperatures exceeding 75°F.
Atrazine	Annual Grassy Weeds and Select Broadleaf Weeds	NR	NR	T	T	T	T	T	Often found in products catered to St. Augustinegrass and/or Centipedegrass Lawns. (Weed B Gon, Image, Weed Stop "for St. Augustinegrass")	Injury is very likely on bermudagrass lawns. Refer to label. Do not overapply.
Dicamba	Broadleaf Weeds	T	C	L	C	C	T	T	Often used in combination with other active ingredients like 2,4-D or MCPP. (Weed B Gon; Weed Stop; RoundUp for Lawns)	Can be absorbed by roots. Do not apply near shallow-rooted trees. Use caution when applying to St. Augustinegrass, Centipedegrass, or Buffalograss. Refer to label. Do not overapply.
Imazaquin	Sedges, Some annual grasses	T	C	T	C	C	T	T	Image kills Nutsedge.	Do not use for winter weed control in St. Augustinegrass. Refer to label.
MCPA	Broadleaf Weeds	T	L	L	C	C	T	T	Often used in combination with other active ingredients like 2,4-D. (Weed B Gon, Weed-n-Feed, Roundup for Lawns)	
Mecoprop-p (MCP)	Broadleaf Weeds	T	L	L	C	C	T	T	Often used in combination with other active ingredients like 2,4-D. (Weed B Gon, Weed-n-Feed, Roundup for Lawns)	
Sulfentrazone	Sedges, broadleaf weeds	T	T	T	C	C	C	C	Ortho Nutsedge Killer, Select Roundup for Lawns products	This product may temporarily discolor St. Augustinegrass or zoysiagrass leaves, particularly when grass is stressed. Mowing will remove discoloration.
Penoxsulam	Select broadleaf Weeds	T	L	C	C	C	T	T	Fertilome Dollarweed Killer, Select Roundup for Lawns products	Can take 2-3 weeks to be effective. May not control larger weeds when applied alone.
Quinclorac	Select grassy and broadleaf weeds including clovers	T	T	NR	NR	NR	T	T	Often used in products with added "Crabgrass Killer." (Weed Stop + Crabgrass Killer, Roundup for Lawns 1-3)	Offers relatively good grassy weed and clover control. Do not apply to St. Augustinegrass.

*BE – Bermudagrass; BU – Buffalograss; CE – Centipedegrass; SA – St. Augustinegrass; Z – Zoysiagrass

C – CAUTION: Select products containing these active ingredients may be labeled as 'safe' to use on these species. However, proceed with caution, as there may be a higher than normal risk of injury. Read and follow label instructions to reduce the risk of injury at application.

L – Label: See label recommendations. There may be limited data available for tolerance of this species to this active ingredient AND/OR turfgrass tolerance may be primarily determined by product composition.

NR – Not Recommended: Indicates that this active ingredient is generally not recommended for that particular species of turfgrass due to the high risk of injury or death. Read and follow label instructions. Do not use a product if your turfgrass species is not included on the label as a tolerant species.

T – Tolerant: Indicates that these species are generally tolerant of the select active ingredient. Remember that many products will contain more than one active ingredient and that not all active ingredients may be safe to use on your desired turfgrass species. Read and follow label instructions to minimize the risk of injury at application.

Nonselective Herbicides are designed to control or remove all vegetation. These products include contact and systemic herbicides (See Below). An example of a common herbicide with nonselective chemistry is glyphosate (Roundup).

Contact Herbicides are designed to target only the parts of the plant with which the herbicide comes into contact. Contact herbicides can be used to control or chemically remove tree saplings without damaging the parent tree. An example of a common contact herbicide is glufosinate (Finale).

Systemic Herbicide are designed to target the entire plant. Systemic herbicides are absorbed by the roots or foliage and then translocated throughout the plant.

Herbicide Labels

Before using any lawn care product, read the label in its entirety. Follow the instructions carefully. There are critical parts of the label that you can use to streamline product selection. Many product labels are available on the manufacturer website as PDF documents to be reviewed online rather than on the product packaging. Another useful resource is the Crop Data Management Systems (CDMS) Label Database (<http://www.cdms.net/Label-Database>). In addition to searching for product brand names, the CDMS Label Database also offers an advanced search option to review products labeled for specific crops, sites, and target pests.

Outside of the Label

The outside label on the product will look similar to Figure 1 and generally contains the following information in some form.

Inside the Label

A. List of Weeds Controlled

This is a list of the target weeds controlled by this product. This list is typically generated using research results from tests conducted before the

product became available for commercial sale. Review this list to determine if a particular product is effective on the weeds infesting the lawn. The AggieTurf website found at <https://aggieturf.tamu.edu/turfgrass-weeds/> can be useful for proper identification of lawn weeds. In some cases, the list of target weeds may contain additional information about application recommendations for difficult-to-control weeds.

SuperBrand — 1

Kill My Weeds — 2

Weed Killer for Lawns — 3

CAUTION: See inside booklet for first aid and additional precautionary statements. — 4

Active Ingredients:

Mecoprop-p, dimethylamine salt*	5.30%
2,4-D, dimethylamine salt**	3.05%
Dicamba, dimethylamine salt***	1.30%
Other Ingredients	90.35%

* (+)-(R)-2-(2-methyl-4-chlorophenoxy) propionic acid equivalent to 4.38%
 **2,4-Dichlorophenoxyacetic acid equivalent to 2.53%
 ***3,6-dichloro-o-anisic acid equivalent to 1.08% Isomer Specific by AOAC Method 6.001-5.

1 Manufacturer: This refers simply to the manufacturer of this product (e.g., Bayer, Scotts, Ortho).

2 Brand Name: This is the brand name or trade name for this product. *It is very important to note that products that contain the same active ingredients may have different brand names, and products that have the same or very similar brand names may contain completely different active ingredients.* It is especially important to pay attention to the ingredient listing.

3 Product Description: This is a short statement describing what the product is designed to do (e.g., herbicide, fungicide, insecticide).

4 Signal Word: Indicates the level of acute toxicity to humans.
CAUTION — These products are the least harmful to you.
WARNING — These products are more toxic than those with the “CAUTION” label.
DANGER — Very poisonous or irritating and should be used with extreme care because they can severely burn skin and eyes. Pesticides classified under “DANGER” are often restricted-use pesticides and are not available to the general public.

5 Ingredients: This is a list of the chemical name of each active ingredient (herbicide), the percentage by weight of each active ingredient, and the percentage by weight of all inert ingredients.

Figure 1. Example layout for an herbicide product label to demonstrate the label components important for product selection.

Common Examples of Difficult-to-Control Lawn Weeds:



Crabgrass
Digitaria spp.



Doveweed
Murdannia nudiflora (L.) Brenan



Virginia Buttonweed
Diodia virginiana L.



Annual Bluegrass
Poa annua



Purple Nutsedge
Cyperus rotundus



Dallisgrass
Paspalum dilatatum



Sandbur
Cenchrus spp.



Spotted Spurge
Chamaesyce maculate L.

There should be a list of turfgrass species that are able to tolerate the product. Some products may make this list easier to find than others. Rather than a list, there may also be a statement such as: “This product is safe to use on bermudagrass and zoysiagrass lawns.”

There may be additional “Important” statements regarding where and when it is appropriate to use this product. Some examples of common precautionary statements on lawn herbicide labels are:

1. Do not use this product on St. Augustine or Centipedegrass lawns.
2. Safe to use on St. Augustinegrass EXCEPT Floratam. Do not use on FLORATAM.
3. Keep product off of exposed roots or leaves of ornamental plants.
4. Do not use on or around fruits, vegetables, and flowers.

B. Directions for Use

This section will provide a broad overview of instructions for appropriate use and handling of this product. There will often be subheadings to help deliver product information effectively.

1. Where to Use:

Many herbicides will have a section that describes appropriate areas for product use. In some cases, there may be specific instructions for different types of lawns in this section—Cool-Season Turfgrass Lawns (Northern) and Warm-Season Turfgrass Lawns (Southern). There will often be cautionary statements regarding areas in which the product should not be used. Statements may include: “Do NOT use product on the following: bentgrass, dichondra, etc.”. There may

also be cautionary statements about using the product above certain temperatures such as: “Do NOT apply to hybrid bermudagrass when daytime temperatures exceed 85°F.”

2. How Much to Use/Application Rates:

This section will specify appropriate herbicide application rates to control target weeds and minimize the risk of turfgrass injury. *Do not exceed the maximum application rate OR the maximum number of applications per year.*

Many products available to homeowners for spot treating are formulated and packaged as “Ready-To-Use” or “Ready-To-Spray.” Follow label recommendations for appropriate application of the product for best results. Products designed for hose attachments may have different settings to change the concentration of the product being applied. Follow label recommendations for these products as well.

For broadcast application of an herbicide, follow label recommendations to match appropriate application rates depending on your target weeds and turfgrass species. Be advised that broadcast applications also require knowing the square footage to be treated. Application rate tables on herbicide labels (Fig. 2) may also provide indications regarding the need for multiple applications on difficult-to-control weeds.

WEEDS CONTROLLED OR SUPPRESSED		
Weeds Controlled or Suppressed		Rate 1 lb./1,000 sq. ft.
Chickweed, common Chickweed, mouseear Clover, hop Clover, red Clover, white Dandelion, common Dollarweed English lawn daisy False dandelion Florida betony	Ivy, ground Lespedeza, common Medic, black Parsley-piert Plantain, broadleaf Plantain, buckhorn Virginia buttonweed ¹	3.4
Kylinga, annual and green (suppression only) ¹	Nutsedge, purple and yellow (suppression only) ¹	2.3 - 3.4

¹ Re-treatment may be necessary

Figure 2. An example of recommended product rates to control targeted weeds. (Product: Fertilome® Dollar Weed Control)

Source: <https://www.fertilome.com/ProductFiles/11913%20open%20mouth%20bag%207-10-14.pdf>

3. How to Use/Instructions for Use:

This section will describe how to apply the herbicide. These instructions vary according to the product formulation (granular versus liquids). Many home lawn herbicides are designed to work independently or in conjunction with application equipment designed by the manufacturer. Some products may also be formulated and packaged as hose-end attachments. Read the label carefully to determine the correct equipment for proper product application. Granular herbicides will typically require a spreader—such as handheld, rotary, or drop spreaders—that should be calibrated before application.

This section may also include instructions for using Personal Protective Equipment (PPE) including gloves, masks, and long pants and long-sleeved shirts. ***Always follow label recommendations regarding appropriate PPE and handling of products.***

4. Instructions for Storage and Disposal:

After application, follow label instructions for proper disposal or storage of unused herbicide. In many cases, the product should be stored somewhere safe from temperature extremes and inaccessible to pets and children. Empty containers are usually disposed of according to label instructions, but partially filled containers may require disposal at a local solid waste agency.

Weed photos courtesy of Dr. Casey Reynolds

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