

Residential Weed Control

Using Integrated Pest Management (IPM) - 2016

Weed control is best accomplished by using an integrated approach. This approach begins with **prevention**. Be careful not to allow **weeds to produce seeds** and to not bring seeds into your yard through soil, transplants, or seed lots containing weed seeds. Avoid bringing in **vegetative weed parts** capable of spreading the weed such as underground “stems” called rhizomes or above ground prostrate stems called stolons. **Maintain healthy plants** and space appropriately to help shade soil. This will prevent weed germination and crowd out newly emerged weeds. Plant **varieties adapted** to the area and maintain optimum **fertility and moisture** conditions. **Mulching** at an appropriate depth (2-3 inches) is an excellent way to aid plant growth and reduce weed germination and growth. Layers of cardboard, newspaper, or landscape fabric will help choke out existing vegetation and these can be covered with compost, bark, or other mulching materials. Keeping lawns mowed at the maximum **recommended height** for the grass will also help shade and choke out weeds.

Identifying the Problem

The fundamental principle of Integrated Pest Management (IPM) is correct identification and understanding the pest you wish to control.

Weeds have different **life cycles** which are important to understand for managing them:

Summer annuals germinate in the spring and produce seed in the summer or fall (ex. crabgrass);

Winter annuals germinate late summer or early fall (ex. henbit) and produce seed the following spring;

Biennials typically germinate and produce a rosette of leaves (similar to dandelion leaves) one year and produce a seed stalk and seeds the following year (ex. docks);

Perennials survive from year to year by relying on deep roots and food reserves and frequently spread by underground rhizomes or above ground stolons in addition to seeds.

Weeds are also classified as:

Grasses or monocots which have a single seed leaf and leaf veins running parallel to the larger mid-vein;

Broadleaves or dicots which have two seed leaves (cotyledons) and leaf veins running at an angle from the mid-vein;

Sedges look similar to grasses but have triangular stems instead of round stems.

Determining a plant's **life cycle** and whether it's a **grass, broadleaf, or sedge** is a critical part of weed identification. Identification can then proceed by the use of pictures, weed keys, or by assistance from your local nursery or garden store, or your county Extension Master Gardeners or Extension office.

IPM takes advantage of all appropriate pest management options including, but not limited to, the judicious use of herbicides (USDA). Herbicides are pesticides used to control weeds. In order to better understand herbicides, it is important to understand some of the routine terms used to classify herbicides.

Herbicides are classified according to the time they are applied:

Pre-emergence – prior to weed emergence

Post-emergence – applied to weeds which are already emerged and actively growing

Herbicides are also classified according to their effect on different plants:

Selective – toxic to some plant species, but not to others

Non-selective – toxic or injurious to most or all species to which they are applied

Herbicides are also classified according to their activity in or on plants:

Contact herbicides - affect only those plant parts which they contact

Systemic herbicides - move to varying degrees from the point of contact and affect other plant parts

Herbicides may also be classified by their mode of action – how they affect susceptible plants growth and/or metabolism (ex. growth regulants) or by chemical families from which they are derived (ex. phenoxy).

Using Herbicides

Residential herbicides typically contain one or more active ingredients and are available in several formulated and packaged products. Herbicide **concentrates (conc)** contain the highest concentration of active ingredients and require dilution as directed on the label. **Ready-to-Spray (RTS)** products are diluted and packaged for use in the hose-end applicator in which they are packaged. **Ready-to-Use (RTU)** products are diluted to spray directly from their package, which is usually a trigger or pump package and are well suited for spot spraying. **Granules (gran)** are dry formulations for application with granular spreaders, as are **Weed and Feed (W&F)** products which also typically contain an appropriate fertilizer and should be applied when the timing is proper for both the herbicide and the fertilizer application, especially nitrogen applications in turf grasses. The above abbreviations will be used later to describe the formulations in which subject herbicides are available.

Herbicide Stewardship

Always follow good stewardship practices when using herbicides.

Always Read and Follow Label Instructions – It's the Law! The product label has been approved by US-EPA and is based upon best assessments of the data generated to register the product and the intended use of the product.

Do not spray when heavy rain is anticipated.

Clean up fertilizers or granules from sidewalks and driveways. Keep in mind that this material can wash into a storm sewer if a heavy rain occurs.

Store pesticides in a safe, dry place, away from children.

Purchase or mix no more pesticide than necessary and dispose of any leftover product properly. This is best accomplished by using it as directed or, if not possible, taking it to an approved location for pesticide disposal.

Herbicide Products

The following lists are meant to show examples of products commonly available for residential weed control. We do not recommend specific brands or products nor do we imply criticism by not naming omitted products. Similar products to those listed from other manufacturers can be used if the label instructions are followed.

Additional Use Information

The best source of complete information on product use and precautions is always the product label. In addition to reading the labels from products from store shelves, most can be found on line. Contact the following websites for the manufacturers of many of the listed products:

BayerAdvanced Products: www.bayeradvanced.com

Bonide Products: www.bonide.com

Monterey Products: www.montereylawngardem.com

Preen Products: www.preen.com

Scotts and Ortho products: www.scotts.com (see the respective concentrate products for use information for RTS and RTU products; they are the same except for the dilution instructions)

Spectracide Products: www.spectracide.com

Chemical Weed Control in Lawns and Turf

Selective Pre-emergence to Grasses and Certain Small Seeded Broadleaves

Herbicide Active Ingredient(s)	Lawn Grass Type(s)	Common Brand Examples/ Formulations	Comments
pendimethalin	Fescue, Bluegrass, Perennial Ryegrass Bermuda, Zoysia, Centipede, St. Augustine	Scotts Halts Plus Crabgrass Preventer (granular) Scotts Lawn Pro Step 1 Crabgrass Preventer Plus Fertilizer (W&F)	Apply and water-in before crabgrass germination when lawn is dry in early spring until dandelions reach the puffball stage. Apply in the fall (Aug. – Oct.) to control <u>Poa annua</u> , henbit, or chickweed before they emerge. Best results are achieved if watered in with ¼ to ½ in. within 2 – 3 days. Don't plant grass seed for 4 months. Do not apply to cement, stone, clothing, or shoes. If contact occurs, brush off immediately. Rinse off with water if necessary.
corn gluten	Fescue, Bluegrass, Bermuda, Zoysia, Centipede, St. Augustine	Corn Weed Blocker WOW Supreme Pre-emergent Lawn Weed control and Fertilizer Gluten Natural Weed Controller Concern Weed Prevention Plus	Alternative to conventional herbicides. Suppresses germination of some weed and grass species. Apply prior to germination. Contains protein which slowly releases fertilizer (9-1-0). Water deeply after application.
dithiopyr	Fescue, Bluegrass, Perennial Ryegrass, Bermuda, Zoysia, Centipede, St. Augustine	Bonide Crabgrass and Weed Preventer for Lawns and Ornamental Beds (gran)	Controls or suppresses several grass and broadleaf species when applied prior to germination. Will also control crabgrass post-emergence up to 4 weeks post-germination (1 to 2 leaf stage). Not effective until activated by rainfall or irrigation. Do not use clippings for mulching around vegetables or fruit trees.

Selective Broad-Spectrum (Over 200 Species) Products Applied Early Post-emergence to Grasses and Pre and Post to Existing Broadleaves

<p>dithiopyr plus 2,4-D, & dicamba + MCP</p>	<p>Fescue, Bluegrass, Bermuda, Zoysia, Centipede, St. Augustine (except Floratram)</p>	<p>Spectracide Weed Stop for Lawns Crabgrass Preventer and Broadleaf Weed Killer Granules</p>	<p>Spring-apply just before or during forsythia bloom or first dandelion flowers appear (when Crabgrass is in the 1 to 2 leaf stage) or in the fall about Labor Day when targeting winter weeds. Apply when plants are wet. Do not disturb for 24 hours. A second application may be needed 6 – 8 weeks after the first. Irrigation or rainfall needed for activation. Do not use clippings to mulch other plants.</p>
<p>quinclorac plus 2,4-D, & dicamba quinclorac plus 2,4-D, & dicamba + MCP</p> <p>quinclorac plus 2,4-D, & dicamba + sulfentrazone</p>	<p>Fescue, Bluegrass, Bermuda, Zoysia</p>	<p>Bayer All-In-One Weed and Crabgrass Killer (conc, RTS, RTU) Ortho Weed-B-Gone Weed Killer for Lawns Plus Crabgrass (conc, RTS) Ortho Touch Up (RTU)</p> <p>Spectracide Weed Stop for Lawns Plus Crabgrass Killer (conc, RTS, RTU)</p>	<p>Apply when weeds are small and actively growing and temperatures are below 90° (85°) for Bermuda. If dry, water area 1 or 2 days prior to application. Hard to control species can be retreated after 2 weeks. Leave clippings from first 3 mowings on lawn: do not use clippings from the treated area as mulch or compost for flowers, ornamentals, trees, or vegetables. Bare spots may be seeded 4 weeks after application.</p> <p>Also controls yellow nutsedge and additional weeds. Apply before crabgrass is 3 to 4 inches tall.</p>

Selective Post-emergence Broad Spectrum Broadleaf Weed Control in Turf

Herbicide Active Ingredient(s)	Lawn Grass Type(s)	Common Brand Examples/ Formulations	Comments
iron HEDTA	All	Ortho Elementals Lawn Weed Killer (RTS)	Conventional pesticide alternative. Controls/suppresses weeds including dandelions, clover, chickweed, moss, algae. Repeat after 3 – 4 weeks.
2,4-D, MCP, & dicamba,	Fescue, Bluegrass, Bermuda, Zoysia, Centipede, St. Augustine (except Floratram)	Bayer Weed Killer for Lawns (conc, RTS) Spectracide Weed Stop for Lawns (conc, RTS)	Lists over 200 broadleaf weeds. Apply when plants are actively growing. Do not treat when temperatures exceed 85. Use lower rates for Centipede and St. Augustine lawns. Bare spots can be re-seeded 3 to 4 weeks after application.
atrazine	Centipede, St. Augustine	Spectracide Weed Stop for Lawns for St. Augustine and Centipede Lawns (conc)	Kills by pre-emergence and post-emergence action Rainfall within 1 or 2 days may reduce post activity, but is needed within 7 to 10 days for emerging weeds . Best results when weeds are small. Do not apply when temperatures exceed 90. Do not overseed within 6 months of application. Also controls Poa annua and gives partial control of crabgrass.
2,4-D & mecoprop	Fescue, Bluegrass, Bermuda, Zoysia	Scotts Lawn Pro Step 2 Weed Control Plus Fertilizer (W&F)	Apply late spring (April – June), not less than 30 days after Step 1. Apply to wet grass. Daytime temperatures should be between 60° and 90°.
2,4-D, mecoprop, & dicloprop	Fescue, Bluegrass, Bermuda, Zoysia	Scotts Liquid Turf Builder Plus 2 Weed Control (RTS) Scotts Turf Builder PLUS 2 Weed Control with Built-in Spreader (W&F)	Hose end application. Contains 25-1-2 fertilizer. Granular in shaker can. Treats 1,000 sq. ft. (28-2-4)
2,4-D, isoxaben, mecoprop, & dicamba	Bermuda, Zoysia, Centipede, St. Augustine (except improved varieties like Floratram)	Bayer Advanced Season Long Weed Killer for Lawns (conc, RTS) Bayer Advanced Southern Season Long Weed Control for Lawns (conc, RTS)	Active both pre-emergence and post-emergence on some species. Apply no more than twice per year to site. Activate weed barrier by watering (1/4 to 1/2 in.) after application. Clippings from first 3 mowings should be left on the lawn. Do not use treated clippings for mulch or compost around flowers, ornamentals, trees, or in vegetables.

Selective Control of Additional Weed Species in Turf

Herbicide Active Ingredient(s)	Lawn Grass Type(s)	Common Brand Examples/ Formulations	Comments
triclopyr	Fescue, Bluegrass, Zoysia	Ortho Weed-B-Gone Chickweed, Oxalis, and Clover Killer (conc)	Also effective against wild garlic and ground ivy. Keep off foliage and away from exposed roots of ornamentals. Bare spots can be planted after 1 week.
sulfentrazone	Fescue, Bluegrass, Bermuda, Zoysia, Centipede, St. Augustine	Ortho Nutsedge Killer for Lawns (RTU)	Controls yellow nutsedge, kyllinga, goosegrass, wild garlic, and many others. For best results apply before weeds are 3 in. high. Good spray coverage is needed. Wait at least 4 weeks before reseeding.
imazaquin	Bermuda, Zoysia, Centipede, St. Augustine	Image – Kills Nutsedge (conc/ RTS)	Container can be used as a concentrate or hose end sprayer. Water-in within 1-7 days after application to get into root zone. Slow acting (3-5 weeks until weed death). May require more than 1 application. Do not apply to St. Augustine for winter weed control. Wait at least 1½ months before reseeding.
halosulfuron	Fescue, Bluegrass, Bermuda, Zoysia, Centipede, St. Augustine	ProSedge Herbicide (formerly Halosulfuron Pro and Sedgehammer (conc)	Very active herbicide - a 0.03 oz (0.9 gram) packet makes 1 to 2 gallons of spray solution. A surfactant will aid in control. Not for use on soils with a shallow water table (see label). Controls yellow and purple nutsedge and false green Kyllinga. Suppresses green Kyllinga.
fenoxaprop	Fescue, Perennial Ryegrass, Bluegrass	Bayer Advanced Bermudagrass Control for Lawns (RTS)	Established bermudagrass requires up to 7 monthly applications for control; controls crabgrass, goosegrass, foxtails, Japanese stiltgrass. Also can be used around trees and ornamentals except those prohibited on the label. Fescue and ryegrass may be reseeded immediately; bluegrass after 3 weeks.
triclopyr	Fescue & Bluegrass Only	Monterey Turflon Ester (conc)	Controls certain annual and perennial broadleaf weeds and kikuyugrass. Do not permit spray to drift onto non-target plants. Reapply at 4 week intervals when needed. Established bermudagrass control requires 4 or 5 applications at 4 week intervals at the rates indicated on the label. Do not apply more than 5.87 fl oz/ 1,000 sq ft/ yr.

Non-selective Weed Control

Alternative Herbicide Options for Non-Selective Contact Weed Control

Herbicide Active Ingredient(s)	Common Brand Examples/ Formulations	Comments
d-limonene (citrus oil)	Avenger Weed Killer (conc, RTU) Greenmatch (conc)	Use along fences, foundations, sidewalks, walls, driveways, patios, mulch beds, gravel beds, lawn and garden preparation, around trees, shrubs and flowers. Active ingredient: d-limonene 70% and 55%, resp.. Complete coverage is necessary. Mix in ratios of 1:7 to 1:3 with water according to weed size and type.
clove oil, cinnamon oil	Weed Zap (conc) SaferGro Weedzap (conc)	Best results when applied to actively growing emerged green vegetation six inches in height or less. Controls both annual and perennial plants, but does not translocate, and only affects plants actually coated with the spray solution. Suggests 4 to 6.4 oz/gallon of water, resp).
clove oil, vinegar, citric acid	St. Gabriel BurnOut II (conc, RTU)	Spray directly onto plants until wet. Perennials may require 2 sprayings. Mix 1 gallon of concentrate with 2-3 gallons of water.
acetic acid	Nature's Glory Weed and Grass Killer (25% conc, 6.25% RTU)	Concentrations of acetic acid above the 5% in vinegar usually provide superior control.
salts of fatty acids	Safer Moss Killer and Algae Killer and Surface Cleaner (RTS, RTU) Safer Fast Acting Weed and Grass Killer (RTU), Monterey Herbicidal Soap (conc) Bayer Advanced Natria Grass and Weed Killer (conc, RTU)	Kills weeds and unwanted grasses in and around walks, fences, patios, driveways, flowerbeds, vegetable gardens, trees and shrubs. Effectively eliminates mosses, algae, lichens, liverworts and grime. It also eliminates mosses in lawns. Can be used on weeds, algae or moss growing on or around buildings, sidewalks, fences, trees, bark mulch, driveways, patios and gravel. Herbicidal soap can be used at any time during the year. Best results are obtained with young, actively growing weeds, less than five inches in size. Repeat treatment every 2 to 3 weeks for control of new growth.

Conventional Non-Selective Weed Control

Herbicide Active Ingredient(s)	Common Brand Examples/ Formulations	Comments
glyphosate + pelargonic and other fatty acids	Scotts Ready-To-Use Weed and Grass Killer III (RTU)	Shows faster foliar activity than glyphosate. Do not spray desirable plants. All ornamental flowers, trees, and shrubs may be planted one day after application; grasses, herbs, vegetables, and fruit after three days.
glyphosate +diquat	Scotts Roundup Weed and Grass Killer Concentrate (conc)	Fastest acting product. Can be used for site renovation. Grasses, vegetables, herbs and fruits can be planted 3 days after application; ornamental flowers, trees, and shrubs 1 day post-application.
glyphosate + diquat + imazapyr	Roundup Concentrate Extended Control Weed and Grass Killer Plus Weed Preventer (conc & RTU)	In addition to non-selective control of established plants, also provides up to 4 months <u>residual</u> control. Do not use for turf or site renovation.
glyphosate + diquat + indaziflam	Bayer Advanced DuraZone Ready-to-Use Weed and Grass Killer (& conc)	Provides up to 6 months residual control. Rain fast in 30 minutes. May be necessary to water in for residual protection. Ornamental bedding plants, trees, shrubs, sod, and seed may be planted 6 months after application.
glyphosate +imazapyr	Ortho Ground Clear vegetation Killer (conc, RTU)	Kills weeds and stops weed growth for up to one year. For best results apply on a sunny day above 60°. Cut and remove weeds taller than 6 inches before treatment.
diquat + fluazifop + dicamba	Spectracide Weed and Grass Killer Ready-To-Use (& conc)	Rain fast in 15 minutes. Avoid drift onto desirable plants. Replant ornamental flowers, trees, and shrubs after 1 day; lawn grasses after 7 days.

Weed Control in Ornamentals

Selective Pre-emergence Weed Control in Ornamentals

Herbicide Active Ingredient(s)	Common Brand Examples/ Formulations	Comments
trifluralin	<p style="text-align: center;">Preen Garden Weed Preventer (gran)</p> <p style="text-align: center;">Preen Garden Weed Preventer Plus Plant Food (gran)</p>	<p>Stops weeds from germinating in flower and vegetable gardens, ground covers and around trees and shrubs. Will not kill existing weeds – remove prior to application. Not for use on lawns. Can also be used in vegetable gardens. Do not apply when foliage is wet. Sweep away stray granules from concrete, stone, or other surfaces to prevent staining. Do not apply to Ajuga, Myrtle, or Pachysandra until well established.</p> <p style="text-align: center;">See above comments. Contains 9-12-9. Both products also sold under MiracleGro name, but fertilizer product contains 10-10-10.</p>
dithiopyr	<p style="text-align: center;">Preen Southern Garden Weed Preventer (gran)</p> <p style="text-align: center;">Preen Southern Garden Weed Preventer Plus Plant Food (gran)</p> <p style="text-align: center;">Bonide Crabgrass and Weed Preventer for Lawns and Ornamental Beds (gran)</p>	<p>Use only around ornamentals listed on the label and only around established flowers as per label.</p> <p style="text-align: center;">See above comments. Contains 6-8-6.</p> <p>Single or split application. Spread granules uniformly. Controls or suppresses several grass and broadleaf species when applied prior to germination. Will also control crabgrass post-emergence up to 4 weeks post-germination. Not effective until activated by rainfall or irrigation. See label for list of tolerant ornamentals.</p>
trifluralin + isoxaben	Preen Mulch Plus (formulated on mulch)	Provides up to 6 months control. Use around only established ornamentals specified on the label. Do not use around food crops. Available in several colors.
oryzalin	Monterey Weed Impede (conc, RTS)	<p>See label for tolerant and susceptible weed species & ornamentals. Remove existing weeds prior to treatment. Can be sprayed over established plants as directed on the label. Will turn sprayed surfaces yellow. Do not allow contact with paint, stucco, wood, brick, clothing, etc.</p>

Selective Post-emergence Weed Control in Ornamentals

sethoxydim	Monterey Grass Getter (conc)	<p>May be applied “over the- top” of desirable plants infested by weedy grasses or as a directed spray to weedy grasses (including Bermudagrass) when label directions are followed. See label for a list of tolerant and susceptible species. Apply with a surfactant.</p>
------------	------------------------------	---

Vegetable Garden Weed Control

Selective Garden Weed Control Pre-emergence

Herbicide Active Ingredient(s)	Common Brand Examples/ Formulations	Comments
corn gluten	Preen Vege Garden Organic Weed Preventer (gran)	For veges, herbs, and fruit. Inhibits root development in new weed seedlings. Does not control established weeds – remove prior to application. Sprinkle product monthly around established (2 – 3 in tall) vege plants to prevent new weeds from emerging. Reapply every 4 – 6 weeks. Can be applied until the day of harvest.
trifluralin	<p>Preen Garden Weed Preventer (gran)</p> <p>Preen Garden Weed Preventer plus plant Food (gran)</p>	<p>Also for use on ornamentals. Inhibits root development in new weed seedlings. Does not control established weeds – remove prior to application. Do not use on lawns. Apply only to veges listed on the product label in the manner suggested on the label. Do not apply when foliage is wet. Sweep away stray granules from concrete, stone, or other surfaces to prevent staining.</p> <p>See above comments. Contains 9 – 12 – 9</p> <p>Both products also sold under MiracleGro name, but fertilizer product contains 10-10-10.</p>

Garden Weed Control – Post-emergence

sethoxydim	Monterey Grass Getter (conc)	Controls grasses only. Do not apply on or around any fruit or vegetables not listed on this label, especially sweet corn. Applications on and around tolerant vegetables and fruit should be applied with only a tank type sprayer. A second application may be made to all listed vegetables and fruits except peanut and strawberry. Observe listed intervals between application and harvest of crops.
------------	------------------------------	---

Vine and Brush Control

Herbicide Active Ingredient(s)	Common Brand Examples/ Formulations	Comments
glyphosate	<p>Roundup Weed and Grass Killer Super Concentrate (conc)</p> <p>Bonide KleenUp (conc, RTU)</p>	<p>50.2 % glyphosate. Best value for widespread weed problems. Slow acting (wilting begins 2-4 days after application); maximum translocation in perennials. Can be used to treat stumps to prevent regrowth.</p> <p>Conc. 41%. Treat brush when green and growing. If more than 5 feet tall, cut back and treat regrowth. Fall sprayed brush may not die until spring. Hard to control species (blackberry, kudzu, or poison ivy) may require a second application in 30 days. Cut vines to 3 or 4 feet and spray thoroughly when possible; if desirable foliage prevents this, cut back to soil level and treat regrowth. See label for rates and species controlled.</p>
glyphosate + triclopyr	Roundup Concentrate Poison Ivy Plus Tough Brush Killer (conc, RTU)	Kills poison ivy, poison oak, poison sumac, wild blackberry, and kudzu. Also kills tough weeds and grasses. Avoid drift to desirable plants by spraying when calm and shielding with cardboard or plastic. Apply when plants are actively growing and above 60. Ornamental flowers can be planted 1 day after application; lawn grasses 7 days; non-conifer trees and shrubs 14 days; and conifers 30 days.
triclopyr	<p>Ortho Max Poison Ivy and Tough Brush Killer (conc, RTU)</p> <p>Bayer Advanced Brush Killer Plus (conc, RTU)</p>	<p>Do not spray desired plants. Apply when plants are actively growing and air is calm. Avoid drift to desirable plants. Spray foliage, stems, and trunks until wet. Wilting or yellowing will occur in 2 to 6 weeks. Kills poison ivy, poison oak, kudzu, and wild blackberry plus a number of other species.</p> <p>Rain 2 hours after application will not decrease effectiveness. Treat stumps with a paint brush with concentrate and throw brush in trash. See label for additional information.</p>

We do not recommend specific brands or products nor do we imply criticism by not naming omitted products. Similar products to those listed from other manufacturers can be used if the label instructions are followed.

Residential Weed Control Using IPM 2016 was written by:

Wayne Carlson, PhD Weed Science, Extension Master Gardener Volunteer Wake County

Jeana Myers, PhD Soil Science, NC Cooperative Extension, Horticulture Agent Wake County

Wake County Cooperative Extension, 4001 E. Carya Drive, Raleigh, NC 27610 tel. [919-250-1100](tel:919-250-1100)

Wake County Extension Master Gardener Volunteers tel. 919-250-1084

