chapter 7

Weeds

In a nutshell...

- A weed is just a plant out of place; learn to tolerate some weeds.
- You'll need to manage weeds every year—you'll rarely get rid of them altogether.
- There is no silver bullet to management; it's usually a matter of effort.
- Knowing a weed's life cycle is important to making a management decision. If you know a weed is a creeping perennial, such as quackgrass or Canada thistle, pulling it won't be effective. In this case, chemicals might be needed.
- Check the resources at **hort.extension.wisc.edu** for issues not covered in this chapter.

MASTER GARDENER
UNIVERSITY OF WISCONSIN–MADISON
DIVISION OF EXTENSION

Introduction

A plant out of place—any plant growing where it's not wanted—is considered a weed. It doesn't have to be something with the word "weed" in its name. For example—a volunteer tomato plant in your flower garden could be considered a weed.

Some plants are "weedier" than others. A weedy plant may:

- Grow very quickly.
- Be highly competitive.
- Produce abundant, long-lived seeds.
- Reproduce vegetatively.
- Be toxic or noxious.
- Have offensive odors.
- Lack ornamental appeal.

Weeds are remarkably adapted to most sites. They compete for water, nutrients, and sunlight and, at the same time, may harbor diseases or insects and look unsightly. A given weed's impact on a garden depends on the type of weed, its density, and the time of emergence relative to other plantings.

Weeds can reproduce prolifically, whether by seed or vegetatively, and have evolved to disperse in a multitude of ways. Fortunately, weeds can be managed in many ways as well.

Learning objectives

1. Understand the concepts of weed and invasive plants.
2. Understand how integrated pest management plays a role for managing weeds.
3. Understand the different types of weeds and why this is important when selecting your management strategy.
4. Know where to go for more information on specific weeds and how to manage them.

Types of weeds

Weeds are commonly grouped according to similar life cycles and general botanical categories for management purposes. The principal groups and common examples of each are outlined below.

Weeds by life cycle

Annuals complete their life cycles in one growing season.

- These plants grow quickly from seeds every year, and reproduction is exclusively by seed.
- Most annuals germinate when conditions are favorable. Environmental conditions that allow for germination are species-specific.
- Infestations can be difficult to eradicate because of the dormant seed persisting in the soil.

- Summer annuals germinate in the spring or early summer and then grow, mature, and set seed during one growing season. Summer annuals die in the fall.
- Winter annuals germinate and grow during the fall, overwinter, and then continue to grow and produce seed during the following spring.
- Purslane, pigweed, and crabgrass are examples of annual weeds.

Biennials require two growing seasons to complete their life cycles.

- These plants first produce vegetative growth consisting of only leaves—a radial cluster of leaves known as a rosette lying close to the ground—and then, in the second year, flower, set seed, and die.
- Wild carrot—or Queen Anne's lace—is a common biennial in disturbed areas and along roadsides. Burdock and bull thistle are other common biennial weeds in Wisconsin.

Perennials live for three or more years.

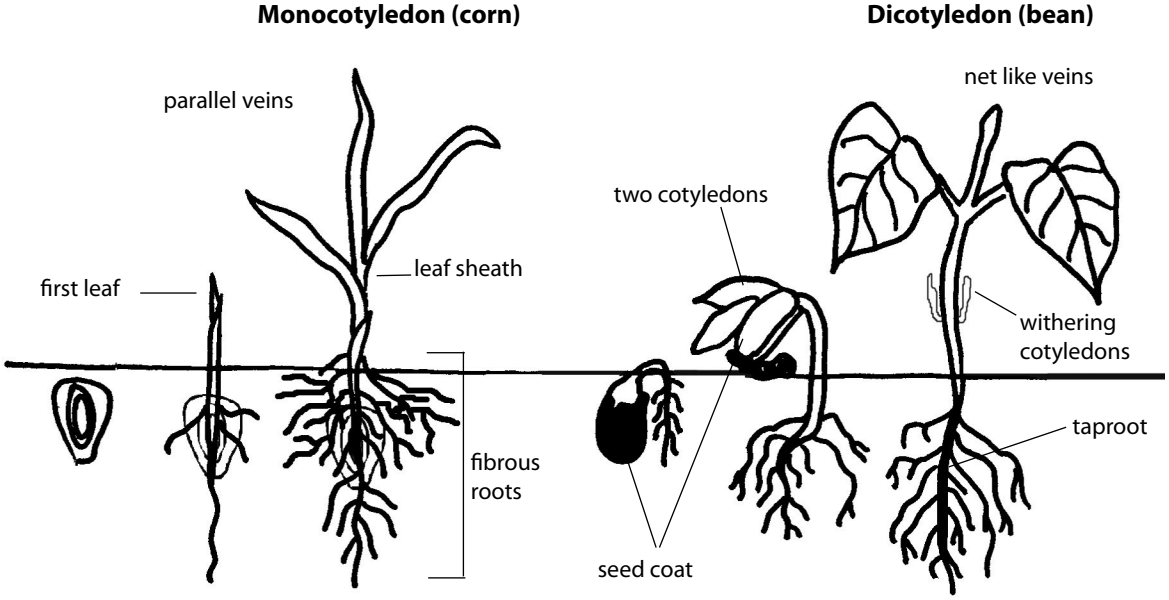
- They grow for many years from the same root system and may or may not flower the first or later years.
- Although they may propagate from seed, for many perennials **vegetative reproduction** is more common.
- Infestations of spreading perennials often occur in patches and are perpetuated from roots, **rhizomes**, or **stolons**, or cut root and stem portions that can store large amounts of energy that they dedicate to growth. This is what makes them so challenging to control.
- Many woody plants may be weedy, too, but are often treated differently than herbaceous perennial weeds. Seeds from trees such as box elder and silver maple may blow into your garden. Squirrels might plants walnuts. Grape seeds may be deposited by bird droppings.
- Milkweed, quackgrass, and dandelions are all common perennial weeds in Wisconsin.

Weeds by plant type

Broadleaf plants are **dicots** that have two **cotyledons** in their seeds. They also have wide leaves with leaf veins radiating from a midrib, a taproot or fibrous root system, and flower parts arranged in fours or fives. These flowers often have sepals and petals, and are either pollinated by wind or insects or are self-pollinated. Field bindweed, galinsoga, and ragweed are all broadleaved weeds.

Grasses are **monocots** that have a single cotyledon in their seeds, long narrow leaves with parallel veins, a fibrous root system, and flower parts generally in threes. The flowers lack sepals or petals and are mainly wind-pollinated. Figure 1 compares dicot and monocot seedlings.

FIGURE 1. Dicot and monocot seedlings



Some plant groups don't fit into these categories:

- Sedges are similar to grasses, but instead of having a cylindrical hollow stem, sedge stems are triangular in cross-section. Yellow nutsedge is a perennial species that reproduces by seed and stolons terminated by hard tubers.
- Rushes, horsetails, and ferns are other groups of plants that are commonly found in wet soils.

Weed dispersal

Weeds are dispersed by both natural and artificial means. Wind, water, and animals move seed, often over great distances. Humans also move weed seeds and vegetative reproductive parts of perennial weeds in soil (including in potted plants), on equipment and vehicles, or on clothing.

Individual plants are capable of producing thousands of seeds (or more) that remain viable for varying lengths of time in the soil, depending on the species and conditions. The accumulation of viable weed seeds in the soil is called a **seed bank** and consists not only of those on the surface but those deeper in the soil as well. Some weed seeds persist for more than 50 years in the soil, but most remain viable for less than 5 years in the environment.

Weed identification

It is important to learn how to identify common weeds, as management is often species-specific. The descriptions provided for various weeds in "Common problem weeds in Wisconsin gardens" later in the chapter indicate growth habit and life cycle. There are key points in the life cycle of any species, and management techniques generally are applied at these times. You need to learn to identify species well enough to determine when and how they are best managed. It requires an intense interest to become good at taxonomy, but a small amount of acquired skill will help in management strategies. Print or online weed identification resources are invaluable aides.

Invasive plants

The term "invasive weeds" seems like an oxymoron, since the very fact they take over our lawns, gardens, and fields is why weeds are called weeds. The term "invasives" refers to non-native introductions that have become very troublesome and more commonly occur in "natural" or relatively unmanaged habitats, such as forests, parks, or wetlands, rather than in landscaped or agricultural areas. Invasives tend to reduce native plant diversity by outcompeting the existing plant species and dominating the plant community. Their presence also negatively affects the fauna of the area, since the weed generally does not provide the same type(s) of food and shelter the native plants do. If not controlled, they pose significant economic and environmental risk to the entire ecosystem.

There are many invasive weeds: some that are particularly problematic in Wisconsin are garlic mustard, common buckthorn, purple loosestrife, leafy spurge, and field bindweed. These invade very different environments and cause very different concerns.

Managing invasive species is often very difficult. Measures are generally only modestly effective and may be initially as destructive to native vegetation as the weed itself. But suppressing these aggressive plants is essential to preserving the integrity of natural areas. Management efforts are often organized by the Wisconsin Department of Natural Resources, municipalities, or citizen groups since these weeds occur over large areas and often on public lands.

Weed management

The best way to limit the impact of weeds in the garden is to prevent them from becoming a problem in the first place. Weed management should start before planting, especially in new gardens. An effective weed management plan includes cultural practices to maximize growth of healthy plants that can compete while minimizing weed growth and seed production.

No matter what weed management practices you use, some weeds will inevitably escape control. It is important to prevent escaped weeds from spreading or producing seeds so the seed bank won't increase. If new seed isn't added to the soil, the numbers of weeds emerging each year will gradually decrease.

Site preparation

It's important to minimize perennial weeds when creating a new garden. Many times this will be your only opportunity to kill certain weeds without affecting the newly planted flowers, trees, or vegetables. In some cases repeated cultivation will eliminate many perennial weeds as well as reduce the overall weed seed bank in the soil. Allow weeds to germinate and then destroy them by cultivating them several times in succession. If you need to resort to herbicides, make sure they won't kill other plants in your garden.

Weed management methods

The way you grow plants greatly influences the type of weeds that become a problem and the way you manage them. Where the crops are planted every year and then removed at the end of the growing season, you have many more opportunities to manage weeds without damaging those crops. Vegetable gardens and annual flower beds are normally cleaned out every year, often leaving bare soil. This provides an opportunity to till or apply broad-spectrum herbicide if needed to manage persistent perennial weeds. Sowing a cover crop is another way to prevent or smother weeds.

Where the plants are perennials, you have fewer options. If you must use herbicides, make sure they are selective. Limit any cultivation to just the soil surface so you don't injure the roots of herbaceous perennials, trees, and shrubs. Dense groundcovers may be a solution to minimize weeds.

In the home garden you have three general methods to manage weeds:

- Mechanical removal and cultivation.
- Cultural options, including mulching or smothering weeds.
- Herbicides, both organic and synthetic, as chemical control.

In Wisconsin, biological control is used against a few selected weed species, most commonly in the case of invasive weeds and rarely in home gardens.

Mechanical options

Most home garden weeds can be managed mechanically. **Cultivation** and hand-pulling are the most common methods. Cultivation may be accomplished with a variety of tools or by hand-pulling (see chapter 9, General Gardening Practices). Since you can only remove weeds that are actually present, you'll need to repeat the process several times throughout the growing season.

If you are using a tool to cultivate, keep the cutting edge(s) of your implement sharp. Shave the weeds off at the soil line while gently breaking up the crust. Deep tillage injures many shallow-rooted plants and helps move a fresh supply of weed seeds into the upper layers of the soil where they are more likely to germinate. Hoe carefully around your plants and hand-pull the weeds closest to the plants.

Cultural options

Cultural options include general gardening practices that impact weed growth, such as proper plant spacing, keeping plants healthy so they can outcompete weeds, and mulching.

Mulching manages weeds by preventing light from reaching weed seeds, which suppresses germination, and by physically blocking emerging weeds. Mulching is most effective against annual weeds and much less so against aggressive perennial weeds. Mulching alone will not control weeds, but will greatly enhance the effectiveness of other measures, such as hoeing and hand-pulling. There are many types of mulch that you can use in your garden. The choice of materials will depend on the season, what the gardener is trying to accomplish, what is most economical or available, and personal preferences. See chapter 9, General Gardening Practices, for more details.

Cover crops such as buckwheat and oats are plants that are grown and left in place as a living mulch, primarily in vegetable gardens. They prevent weeds from growing, and when they die their remains can be an effective mulch that suppresses weeds in future years. Other benefits include the potential for aiding disease or insect management, providing habitat for beneficial organisms, and, with some cover crops, adding nutrients back to the soil. Cover crops do require

management and their effectiveness can vary. See chapter 9, General Gardening Practices, for more details on cover crops.

Use synthetic mulches such as landscape fabric or black plastic sparingly. They work well for controlling weeds in a vegetable garden. In permanent plantings, however, landscape fabric and black plastic can be more of a hindrance than a help, as some weeds will grow through or around the material. Weeds will still germinate on top of the fabric as well. And using weed fabric eliminates many of the benefits that mulch and compost provide.

Chemical options

Herbicides are another option for dealing with weeds in the home landscape—but they aren't appropriate for all situations.

- Most weeds can be controlled by hand-pulling.
- Not everyone feels comfortable using herbicides in their yards.
- It's difficult to effectively use herbicides in small ornamental and vegetable gardens that contain many species, because plants vary widely in their tolerance and some might be damaged or killed.
- Some herbicides aren't labeled for use on edible plants.

Herbicides may be very useful, however, in larger plantings, in the shrub border, for weed control in lawns, for site preparation, and for spot treatment of perennial weeds in many locations. If you choose not to use herbicides, you may have to live with some weeds, since this is really the only effective way to eliminate certain perennial species.

Herbicides, whether organic or synthetic, can be categorized in several ways (see box).

Herbicide categories

Selective and nonselective herbicides

- A selective herbicide only affects broadleaved or grass-like plants, but not both. Many products target broadleaf weeds, and a growing number of products are becoming available for grassy weed management.
- Nonselective herbicides do not distinguish between broadleaved and grass-like plants. These products are sold as total vegetation killers.

Preemergent and postemergent herbicides

- Preemergent herbicides prevent seeds from germinating. These products must be applied before the weed germinates, which is before you can see them. The residual activity in the soil may vary between products and can last several weeks or months.
- Postemergent herbicides only affect actively growing plants. It's typically best to apply these when the targeted plant is in full flower or after the first hard frost in the fall.

Foliar and soil-applied herbicides

- Foliar applications are applied to the leaves of the plant.
- Soil applications are applied to the soil. For home gardeners, this is predominantly preemergent herbicides.

Many of the products you purchase at the store are a combination of the above. For example:

- If you need to manage crabgrass in your lawn, you might choose a nonselective, preemergent, soil-applied product such as corn gluten meal.
- If you have a number of weeds along your sidewalk, you might pick a nonselective, postemergent, foliar-applied product such as horticultural grade vinegar.
- A glyphosate and triclopyr product for use on woody weeds such as buckthorn would be a nonselective, foliar-applied (to the trunk), postemergent product.

No one herbicide is appropriate for all scenarios, nor is any one herbicide safe to use around all flowers or vegetables. You need to read the label to know for sure what type of weeds a product will control and what ornamental or vegetable plants will tolerate that herbicide. Chemical labels list:

- The weeds that the product will control.
- The crops or plants it is registered for use on and will not injure.
- Directions for mixing the product.
- Rates to use for specific weeds.
- Precautionary measures to prevent human poisoning, phytotoxicity, or environmental contamination.

Read and follow the label directions. For more information on this subject, see chapter 4, Pest Management.

Controlling weed trees and shrubs

Occasionally you will need to destroy unwanted brushy trees or shrubs, such as boxelder or buckthorn, or other persistent woody species. There are several methods to do this.

Digging, or pulling up the entire plant—including its roots—is laborious but effective. Some plants are too large or too numerous to dig out, however. For example, it's impractical to remove bird-seeded grapevines over a large area this way.

Cutting most woody plants off at the base will not kill them, as they will usually re-sprout from the stump or roots. For some woody plants, **girdling** the trunk—completely removing a strip of bark from around the entire circumference of its branch or trunk—is often effective and will not cause the plant to sprout.

A combination of cutting and treating the cut stump or resprouting plant with herbicide can also be effective. 2,4-D can be used but often requires multiple applications. Chemical brush and tree control products containing triclopyr, glyphosate, and/or dicamba are more effective and economical but must be used carefully to prevent damage to desirable plants. Be sure to use products labeled for woody plant management.

Common problem weeds in Wisconsin

Buckthorn (*Rhamnus cathartica*) is a woody species that invades the woodland understory, displacing native species. Buckthorns were brought to the US in the 1800s for use as hedges and windbreaks. Its aggressive growth, seed transport by birds, long seed dormancy (up to several years), and long growing season contribute to its invasive nature. The leaves are oval or elliptical and approximately alternate. The leaves do not turn color in the fall, but eventually **senesce** (fall off), still green, in early winter. Buckthorn can be an alternate host for ornamental and edible (specifically oat and soybean) landscape plant diseases.

Buckthorn is difficult to manage; there are no biological controls at this time. However, vigorous, shade-tolerant woody species such as sugar maple can compete with buckthorn. Mowing very young plants prevents additional seed production, but rarely eradicates the plant. Pulling and digging are easiest with trunk diameters less than 2 inches. Dig before berries are produced and remove the root crown to prevent resprouting. Preemergent and postemergent herbicides are effective. A combination of stem or stump cutting and herbicide treatment is recommended for plants with truck diameters greater than 2 inches. Apply herbicide as soon as possible following cutting. Post-treatment management of the area ensures eradication of seed bank and stump sprouts.

Burdock (*Arctium minus*) is a broadleaved biennial weed found in places where the soil is not disturbed, commonly along fences and in pastures. Cultivation usually interrupts its biennial life cycle. A dense rosette is formed close to the ground in the first year of growth. The second year new leaves are large, hairy, and coarse with a heart-shaped base, resembling rhubarb. Flowers are small and red-violet. Burdock can be an alternate host for powdery mildew.

Thorough cultivation and mowing can effectively control burdock. Spraying first-year rosettes with 2,4-D or dicamba is effective as well. There are no biological controls at this time.

Canada thistle (*Cirsium arvense*) is a broadleaved perennial weed, spreading by an extensively creeping root system as well as by seed. The root system can grow horizontally as much as 6 feet in one season, to form large patches wherever it becomes established. The plants grow 2 to 5 feet tall and have crinkled leaves with spiny edges. The flowers are purple "thistle blooms." The species has male flowers on one plant and female flowers on a different plant—a patch is usually one or the other. Seedlings require full sun to develop and do best where cultivation has created open habitat.

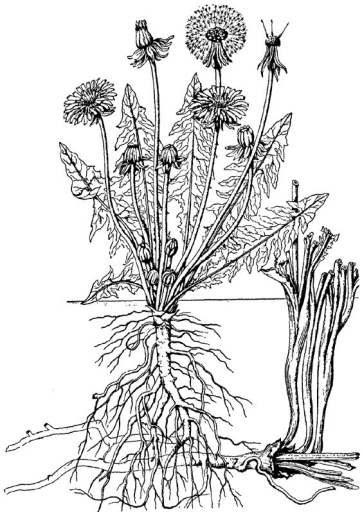
Canada thistle is difficult to manage. The deep roots are difficult to completely remove, and even small pieces will regenerate new plants. Cultivate every 10 to 15 days throughout the growing season for up to two years. Hand-pulling or cutting can stimulate the plants to send up more sprouts from the roots; doing this repeatedly will starve the underground roots, especially where there is dense vegetation to compete with the weeds. Cutting the plants back when they are in bolting to late bud stage is most effective in reducing regrowth. Treat with nonselective herbicides such as glyphosate or selective herbicides such as 2,4-D during the bud to flower stage or after plants have resprouted in the fall. Herbicide treatments do not always kill the root system, so repeated applications may be needed to eliminate a patch. Despite its name, this weed is native to Europe, so the USDA has introduced several natural enemies (three types of weevils and a gall fly) that feed specifically on this plant in the hopes of providing some biological control of this pest.

Chickweed (*Stellaria media*) is an annual broadleaved weed that reproduces by seed. Its stems can creep and root at the nodes, causing further expansion. This low, spreading plant 4 to 12 inches high produces prolific amounts of seed, often resulting in high densities of plants. The tiny white flowers are produced when the plant is still quite small, so gardeners often don't get around to weeding out the plants until after they have already produced seed. Flowers appear only four to five weeks after emergence and seeds are viable as soon as they are shed. Seeds require light to germinate, so this weed is most common in areas of bare soil. Chickweed can also be a problem in lawns with compacted or overly moist soils. Although it is not a strong competitor, seedling crops can be smothered when chickweed forms a mat and covers them. Cultivation is effective for controlling chickweed if the severed plants are removed from the garden or buried; otherwise the plants can easily re-root from stem nodes.

Crabgrass (*Digitaria spp.*) is a coarse annual grass that grows close to the ground, with stems up to 3 feet long that root at the joints. It is a problem both in lawns and gardens. There are two common types of crabgrass that are very similar in appearance—large hairy crabgrass (*D. sanguinalis*) and smooth crabgrass (*D. ischaemum*). Both begin to germinate in May, when the soil temperature at 4 inches stabilizes at 55°F, roughly the same time forsythia are in early bloom. Crabgrass grows well under hot, dry conditions and flowers in late summer, producing thousands of seeds per

plant. In the garden, young plants are easy to pull out. But older plants that have rooted in multiple places along the stem joints require much more effort to remove all of the plant and roots. Remove the plants before they begin to flower and set seed to reduce problems in subsequent years. Maintaining a dense, healthy stand of grass that shades the soil surface will discourage the germination and establishment of crabgrass in lawns. Preemergent herbicides must be applied before crabgrass germinates to be effective, so timing is critical. A second application may be required.

Dandelion (*Taraxacum officinale*) is a ubiquitous perennial weed with a large taproot. Almost everyone is familiar with its cheerful yellow flowers blooming early in the spring and the resulting puffball of seeds. Small plants can easily be pulled, but be careful to remove all of the crown buds (a dandelion knife or weeding stick is useful for this) from larger plants. New sprouts will easily regrow from roots or root segments. Hoeing dandelions is only productive against the new seedlings; anything with a root of over ⅛ inch in diameter will probably resprout. Nonselective herbicides (such as glyphosate) are of limited value against dandelions, since the application often kills the top growth but not the root, and the plant will resprout. The plants then grow back with numerous stems that break off easily from the root, making them even more difficult to dig out. The plants are best removed by hand—digging down deep enough to remove at least ¾ of the tap root, not just the stems coming from the root.



Field bindweed (*Convolvulus arvensis*) is a broadleaved perennial vine. Cotyledons are smooth, dark green, and square to kidney-shaped. Leaves are ovate with spreading basal lobes. Flowers are white to pink. Pulling is effective, but it's difficult to completely remove all perennial roots. Regular cultivation for several years can eradicate plants. Competition by vigorous grasses that shade bindweed can suppress its spread. Preemergent herbicides are effective at managing field bindweed; several postemergent foliar herbicides are effective as well.

Foxtails (*Setaria spp.*) are a group of closely related annual grasses with a distinctive seed head composed of dense bristles. Yellow foxtail (*S. lutescens*) has yellow bristles; giant foxtail (*S. faberii*) has brown bristles; and green foxtail (*S. viridis*) has green or purple bristles. Yellow and green foxtails are normally shorter (1 to 3 feet tall) than giant foxtail, which may grow up to 7 feet tall—although its weak stems usually fall over unless supported by other vegetation. There are some tall types of green foxtail, however, that resemble giant foxtail, but always have much smaller seeds. These grasses can be troublesome weeds in gardens and cultivated areas. Pull small plants before they go to seed.

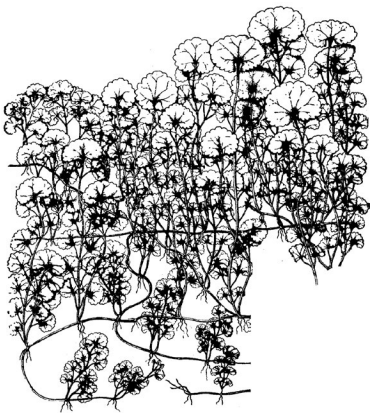
Galinsoga (*Galinsoga spp.*), native to Central and South America, is also called quickweed, because small infestations can expand and set seed so quickly. This highly competitive annual grows 1 to 2 feet tall and has tiny white and yellow daisy-like flowers at the ends of the branches. The plants flower continuously, and the

seeds have no dormancy and germinate all summer. Hairy galinsoga (*G. ciliata*) is often more common than smallflower galinsoga (*G. parviflora*) in gardens, especially in damp areas with rich soil. Hand-pull or cultivate when the plant is in early bloom to prevent seed production. Hoe weekly to control infestations. The plants or cut shoots will rapidly re-root on even semi-moist soil, so remove them from the garden after cultivation. Use a mulch to help reduce seed germination.

Garlic mustard (*Alliaria petiolata*) is an herbaceous biennial weed that is an extremely efficient competitor in many sites, including the woodland understory. It is often found in park lands—which has brought it to the attention of the public. First-year plants form a 2- to 4-inch tall rosette that remains green through winter. Second-year plants produce numerous small, white flowers. The foliage emits a distinct garlic smell when crushed.

Pulling before flowering is effective for individual plants. Dispose of plants in a landfill to avoid potential seed spread. The leaf matter is edible and can be used instead of basil or scallions in many dishes. Mowing and pulling can suppress spread. Quickly restoring disturbed forest canopies can also suppress spread. Several postemergent foliar herbicides are effective at managing garlic mustard.

Ground ivy or creeping Charlie (*Glechoma hederacea*) is an aggressive perennial member of the mint family from Europe with scalloped edges on its round or kidney-shaped leaves. It spreads by both seeds and creeping stems that root at the nodes. Small bluish-purple flowers are borne in small clusters in the leaf axils. It does especially well in shady areas with damp, rich soil and is tolerant to most selective "weed 'n' feed" herbicide formulas. The best way to control ground ivy in flower and vegetable gardens is by hand pulling and hoeing, but you have to be persistent. Treat in the fall after frost with a combination herbicide that contains 2,4-D. However, it will soon re-infest the lawn from any untreated tree and shrub borders or garden areas. Borax as a home remedy is not recommended.



Jimsonweed (*Datura stramonium*) is an annual in the nightshade family (Solanaceae). It is a rather large plant, from 2 to 12 feet tall. The narrow leaves have irregularly toothed edges and a distinctive rank odor. The large, single, funnel-shaped flowers are white to pinkish and eventually develop prickly, egg-shaped seed pods. **All parts of this plant are poisonous.** Hoe out small plants before they set seed.

Lambsquarters (*Chenopodium album*) is a widespread weed that thrives in gardens and farm fields throughout the midwest. This annual plant grows 3 to 5 feet tall with distinctive triangular leaves, often with a soft gray or whitish cast on the surface of young leaves. The inconspicuous green flowers are borne at the ends of branches and in leaf axils and produce large amounts of seed. Populations can be very dense, but the taproot is easy to pull out of soft soil. Hand-pull or hoe small plants, then mulch to prevent further seed germination.

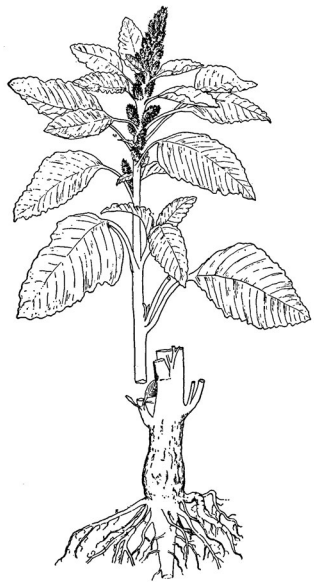
Leafy spurge (*Euphorbia esula*) is an herbaceous perennial weed that can dominate drier landscapes (particularly roadsides) with its creeping perennial roots. Leafy spurge often invades grasslands, pastures, prairies, and old fields. Mature plants are 6 to 36 inches tall. Leaves are linear, ¼ to ½ inch wide and 1 to 4 inches long. A milky white sap is exuded after removing a leaf or damaging root tissue. Flowers and fruits are green-yellow in late spring to summer. Roots are brown and woody; taproots extend to the water table with lateral roots extending up to 15 feet beyond the main taproot.

Pulling is only appropriate for small, young populations. It is difficult to remove the taproot of older populations. Intensive cultivation (every 3 weeks for 1 to 2 years) can eradicate populations. Repeated mowing, prescribed burning, interseeding with a competitive grass, and grazing with sheep or goats can suppress populations but often do not eradicate leafy spurge. Several postemergent foliar herbicides are effective. A combination of management options is recommended.

Milkweed (*Asclepias syriaca*) is a native herbaceous perennial often found in fields and along roadsides, but can be a weed when it invades home gardens. Mature plants are 3 to 5 feet tall. In June to August, clusters of light pink or lavender flowers are seen followed by warty seedpods filled with seeds attached to long white hairs. Several pre and postemergent foliar herbicides are effective at controlling the spread of milkweed.

Common milkweed is an important food for the caterpillars of the monarch butterfly. Many people want to preserve it as a host plant to prevent further monarch population decline.

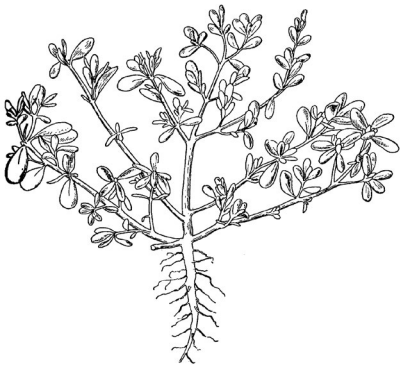
Pigweeds (*Amaranthus spp.*) are a diverse group of several species of annual weeds. Redroot or rough pigweed (*A. retroflexus*) is one of the most common, and very similar to smooth pigweed (*A. hybridus*) and Powell amaranth (*A. powellii*). They all grow erect to 4 to 8 feet, with flowers and seeds in slender panicle-like spikes on the ends of bunches of lateral branches. Prostrate pigweed (*A. blitoides*), however, has 1- to 3- foot stems that spread flat over the ground. Tumble pigweed (*A. albus*) forms a globular plant that breaks off at the ground line when mature and is blown around by the wind to distribute the seeds. All of these plants produce shiny black seeds from inconspicuous greenish flowers borne in groups. They are warm weather weeds, so planting cool season plants that can develop first and form a canopy will discourage the growth of pigweed.



Purple loosetrife (*Lythrum salicaria*) is a wetland invader and an extremely effective competitor, capable of crowding out native plants. It provides poor habitat for wetland species like ducks, and therefore indirectly degrades environmental quality. It is tolerant of many environmental conditions and spreads by seed as well as rhizomes. Pulling is difficult as purple loosetrife has a thick taproot and a network of fibrous rhizomes.

Prevent its spread by inspecting equipment, boats, shoes, and other items that have been in contact with purple loosetrife-infested areas. Remove small populations by digging, but make sure no portions of roots or stems remain. Glyphosate-containing herbicides are recommended: use 1% active ingredient for foliar sprays and 3 to 10% active ingredient for cut stem applications. Triclopyr-containing herbicides have also been effective. All control methods will likely need to be repeated for several years. Two species of leaf-feeding *Galerucella* beetles, as well as other released natural enemies, have been effective in reducing purple loosestrife populations. The state's purple loosestrife biocontrol program, run by DNR and UW–Madison Division of Extension, recruits individuals and groups—including Master Gardeners—to rear and release beetles where infestations remain.

Purslane (*Portulacca oleracea*) is a succulent-leaved annual that requires warm soil to germinate. The fleshy, reddish stems and leaves are drought resistant. The plants form mats a foot or larger in diameter and produce tiny yellow flowers in axils of leaves and clustered at the end of branches from July through frost. The many branched stems may root at lower nodes. Purslane produces seed throughout the growing season and re-roots after cultivation, which makes this plant difficult to control. Hoe purslane before it flowers or hand-pull large plants. Remove any plants from the garden; if left on the soil to dry, the seeds will continue to mature and drop out onto the ground, and small plants or stems often re-root in moist soil. Tillage favors germination and re-rooting, so this is not a good control option. If needed, apply preemergent herbicides in mid to late spring and postemergence herbicides in mid summer through early autumn during periods of active growth. Using mulch may prevent the seed from germinating.



Quackgrass (*Elytrigia repens*) is an aggressive perennial grass that spreads primarily from slender rhizomes. It is the most common rhizomatous grass in Wisconsin and is easily distinguished from reed canary grass, which has much thicker rhizomes. It can be differentiated from other uncommon grasses with rhizomes by its "clasping auricles." Seedlings develop rhizomes after a month, while plants from rhizome buds begin to develop new rhizomes after several weeks. The rhizomes can exert strong physical force to get where they want, even to puncture a neighboring plant's roots (or even bore straight through a daffodil bulb!) or landscape fabric. Plants also regenerate easily from very small broken rhizome fragments, making mechanical control difficult. Quackgrass can be controlled, but this requires persistence—or the use of herbicides. Glyphosate is the most effective chemical for control.

Queen Anne's lace (*Daucus carota*) is a biennial weed that is the wild version of cultivated carrots. The first-year rosette resembles cultivated carrot varieties, with feather-like leaflets and a firm, yellowish spindly taproot. The second-year flower stalk grows to 2 to 4 feet tall with up to a thousand tiny white flowers in lacy, flat-topped clusters. Like cultivated carrots, the taproot of Queen Anne's lace is edible, but the taste is less desirable and the root can cause skin irritation in some people. It is so tolerant of many environmental conditions that it often out-competes native species. To reduce the spread of this plant, remove the seedheads before they mature.

Ragweeds (*Ambrosia spp*.) are notorious for their abundant pollen that causes allergic reactions in many people. The pollen—which is responsible for much respiratory distress from mid to late July or August up to frost—is produced by male flowers in small clusters at the tips of the branches, while the less numerous female flowers and seeds occur at the bases of leaves or upper leaf axils. These plants have tiny green flowers. Common ragweed (*A. artemisiifolia*) is smaller than the giant ragweed (*A. trifida*). It is very adaptable, although it prefers dry soils. The two plants look very different, but both are shallow-rooted annuals that are easily pulled when small or large.

Conclusion

The term "weed" can be applied to any plant growing unwanted and out of place, though many plants are specifically termed weeds due to their growth habits, reproductive rates, lack of ornamental appeal, or some other negative trait. Proper identification of a weed's life cycle and plant type will help determine the proper management strategy. Preventing weeds with good cultural practices is the best management; hand pulling will remove most home garden weeds. Chemical options, both organic and synthetic, should be the last line of defense for the most problematic and aggressive weeds in the landscape.

Resources

Wisconsin Horticulture publications are available at hort.extension.wisc.edu.

FAQs

What kind of weed is in my garden, and what can I spray to get rid of it?

There are many tools available to help with weed ID, which is important in determining how to deal with a weed. If it is a persistent perennial weed, such as quackgrass or Canada thistle, you may need to use an herbicide, but for most annual weeds it's better to manually remove them, and not use herbicides which could harm your other garden plants.

I sprayed my weeds, but they are coming back…what's wrong?

It is likely a perennial weed where you didn't kill the root so it can keep coming back. Or, new seedlings have germinated from the seed bank (or both).

Weeds, practice exam questions

(Answers below)

1. **In a small home vegetable garden, the best choice for controlling annual weeds is:**
   a. Nonselective postemergent herbicide
   b. Manually hand pulling
   c. Preemergent herbicides
   d. Both B and C
2. **A plant completing its life cycle in two years and dying after reproducing is a(n):**
   a. Perennial
   b. Annual
   c. Dicot
   d. Biennial
3. **According to the lecture, one characteristic that may define a plant as a weed is:**
   a. Prolific seed germination
   b. Slow germination rates
   c. Weak root systems
   d. Long life span
4. **An herbicide that is most effective when applied to an actively growing plant is called:**
   a. Postemergent
   b. Preemergent
   c. Selective
   d. Nonselective
5. **An herbicide that affects dicot and monocot plant species differently is considered:**
   a. Postemergent
   b. Preemergent
   c. Selective
   d. Nonselective
6. **To prevent weed seeds from germinating:**
   a. Apply a preemergent herbicide at the appropriate time
   b. Minimize disruption of the soil surface as much as possible (e. g. hoe shallowly)
   c. Apply a sufficient layer of mulch to prevent light from reaching the soil surface
   d. All of the above
7. **Preemergent herbicides are most effective for crabgrass control in lawns when applied:**
   a. Before crabgrass seeds germinate
   b. Anytime crabgrass is actively growing
   c. When crabgrass just begins to set seed
   d. In late fall, in order to prepare for spring
8. **What type of weeds complete their life cycle in one growing season?**
   a. Annual
   b. Winter biennial
   c. Biennials
   d. Perennials
9. **Crabgrass and quackgrass are often confused by homeowners. Which of the following statements is true about crabgrass?**
   a. It is a perennial that spreads by rhizomes
   b. It grows well under hot, dry conditions and flowers in late summer
   c. It can be identified by its "clasping auricles"
   d. It is appropriately controlled with glyphosate
10. **Which concept(s) is(are) applicable to "invasive plants":**
    a. Reduce diversity in natural ecosystems
    b. Outcompete native fauna and flora
    c. Are non-native introductions
    d. All of the above
11. **Which of the following weeds is an annual, with lobed leaves, and green flowers?**
    a. Jimsonweed (*Datura stramonium*)
    b. Purslane (*Portulacca oleracea*)
    c. Ragweed (*Ambrosia* spp.)
    d. Canada thistle (*Cirsium arvense*)

Answer key

1. (b) In IPM, manually hand pulling is the best way to control most weeds in the home garden. Preemergent herbicides used in the vegetable garden may prevent desired seeds from growing; nonselective postemergent herbicides would need to be labeled for use in a vegetable garden and would only be necessary if combating something like quackgrass**. 2. (d) 3. (a) 4. (a) 5. (c) 6. (d) 7. (a) 8. (a) 9. (b) 10. (d) 11. (c)** Find this information in the MG manual or use the Wisconsin Weed Identification Tool at weedid.wisc.edu/weedid.php.