

Weed Control In the Home Garden

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- ▶ Prevention is your first defense. Don't allow onto your property any seed, soil or other materials that may contain weeds or weed seeds.
- ▶ Learn the identity of your weeds so you can choose the best control methods for your home garden.
- ▶ Fertilize, water and plant to favor your crops, not the weeds.
- ▶ Destroy all weeds on your property before they go to seed. Encourage your neighbors to do the same, and comply with weed laws and ordinances.
- ▶ Control your weeds with competitive garden crops, timely tillage, hand weeding, mulching, crop rotation and, where suitable, solarization.
- ▶ Herbicides generally aren't recommended for small home gardens because in the hands of an untrained applicator they can injure home plantings. If you want to use a herbicide, become educated in its use. Make sure anyone you hire to apply herbicides is well qualified.

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Introduction

More human energy worldwide is devoted to weed control than to any other single human endeavor. Weeds can take a large share of the garden's nutrients, water and sunlight, resulting in stunted, malformed and unproductive garden plants. Beautiful flowers and good yields of high-quality vegetables require the control of competitive weeds.

Time, energy and money for weed control can be kept to a minimum by planning carefully and making wise choices of control practices and materials. Wise weed management involves learning about your garden weeds and employing a diversity of practices to handle them. This is called "integrated weed management" (IWM).

A few weed plants may be permissible in a garden that is not expected to be a showpiece, but none should be allowed to produce seeds and spread. How much weediness to allow depends on you, your neighbors, the weed species and the law. Only you can determine how much personal satisfaction you lose due to unsightly weeds, how much loss in garden productivity you will tolerate and how much inconvenience you will stand. Your neighbors deserve consideration because a weedy neighborhood garden is unsightly, reduces property values, will spread weeds through the neighborhood and may pose dangers such as fire or poisoning of animals or humans. Allowing weeds to produce seeds that threaten to infest neighboring property is illegal if the weeds are noxious or if your local ordinances require weed control.

The nature and kinds of garden weeds

A plant that is characteristically objectionable or characteristically interferes with human activities or welfare is called a weed. Weeds are invaders by nature. They are so aggressive that they encroach and persist in even well-kept gardens. All of our troublesome garden weed species are alien to the Northwest.

If individual plants of a normally desirable species interfere with your garden or are objectionable, they are not "weeds" by nature but "plants out of place." The term "weeds" may be applied to those individuals but not to the whole species. Examples of species that are not "weeds" but that often get "out of place" in gardens are volunteer vegetables from last year's crop, strawberries, most lawn grasses, some caneberries and some creeping ornamentals such as sedums, Japanese lantern and various perennial daisies.

Noxious weeds

A few especially troublesome weed species are designated "noxious" by state laws or county noxious weed ordinances. All owners of property with noxious weeds are required by law to control those weeds to protect neighboring property. Some noxious weed species are exempt in certain areas. Compliance with the law in each county is overseen and enforced where necessary by a weed control superintendent.

Lists of noxious weeds are published in newspapers each year. Examples of noxious weeds are Canada thistle, field bindweed, leafy spurge, purple loosestrife and Dalmatian toadflax. Many weed species not designated noxious by law are fully as troublesome but simply haven't been designated noxious. Contact your county weed control superintendent for a list of state and county noxious weeds.

Weed life cycles

Weeds are classified according to their life cycles. **Annual weeds** are the most common in vegetable and flower gardens. Most annuals complete their growth cycle from seed to maturity between spring and fall. Examples are redroot pigweed, common lambsquarters, hairy nightshade, common chickweed, purslane, prostrate spurge, prostrate knotweed, green foxtail, barnyardgrass and crabgrass. They emerge throughout the spring and summer and require continuous control. Some annual weeds such as henbit, shepherds-purse, tumble mustard, field pennycress, groundsel, prickly lettuce, downy brome, common groundsel and common mallow may also germinate in fall or winter and can be large and vigorous by spring.

Biennial weeds grow from seed and produce leaves during the first growing season. They flower, produce seed and die by the end of the next. The cold of winter is required before their stems elongate and flower. Examples are bull thistle, common mullein, teasel and poison hemlock. These are easily handled by routine garden tillage in fall and spring. Biennials usually are not problems in gardens but may appear along borders, in ground covers and in other untilled perennial plantings where attention to weed control is less frequent than in gardens.

Perennial weeds do not die after flowering. They are more difficult to destroy than annuals or biennials. A perennial plant develops a root system capable of producing new plants 3 to 6 weeks after the seed germinates. Roots or underground stems

of perennials live for several years and can produce new flowering shoots each year.

Simple perennials such as dandelion, curly dock, spotted knapweed and broadleaf plantain have tap roots. New growth develops from crown buds. Simple perennials normally do not survive well enough to become problems in gardens that are tilled at least annually.

Creeping perennials have horizontal roots (rootstocks), horizontal underground stems (rhizomes) or horizontal aboveground stems (stolons) from which new roots and shoots develop. Some creeping perennial weeds in Northwest gardens are Canada thistle, quackgrass, field bindweed, leafy spurge, creeping bellflower and ground ivy.

Perennial weeds in gardens occur most frequently near fences, lawns and permanent ornamental plantings where less attention is given to weed destruction. Destruction of creeping perennial weeds requires removal of root fragments as short as 1 inch. Species differ in their susceptibility to various control methods.

For information on weed identification and biology contact the Extension agricultural agent in your county.

Weed seeds in gardens

Most garden weeds come from seeds or live roots that are in the garden soil. Gardens generally contain a large number of weed seeds. Some seeds may be transported to the garden on rototillers, in transplants, in manure, in compost, etc. In addition, most garden weeds produce mature seeds occasionally.

The seeds of most weed species have built-in dormancy that allows a small proportion of seeds to live in the soil several years before germinating. As a general rule, half or more of the live weed seeds in cultivated garden soil germinate in any one year.

Prevention of garden weeds

Prevention is the most important part of a garden weed control strategy because it allows weed problems to be avoided rather than treated. Had we never allowed weed seeds to travel here from their native lands, we would have very few weeds now. The following practices are effective in preventing garden weed infestations:

- Prevent weeds in or near the garden from producing seed. Destroy the weeds, or in the case of annual weeds, frequently cut or pick their flowers to prevent seed production.

Encourage neighbors to be considerate toward one another by stopping weed seed production and growth of perennial weeds on their properties.

- Avoid introducing weed seeds in garden seed, straw, manure, soil or equipment. Read seed container labels to be sure they contain no weed seeds. Examine the seed yourself to verify that you are buying pure seed. Do not use straw or soil from unknown or questionable sources.
- Avoid using uncomposted manure because it will likely contain weed seeds (refer to CIS 679, *Making and Using Compost*).
- Before buying nursery plants or accepting plants as gifts, inspect them to avoid introducing roots, rhizomes or stolons of perennial weeds.
- Clean garden tractors, tillers, hand tools and other equipment and vehicles to remove soil, weed seeds and plant parts. If you hire garden or lawn work, insist that all equipment be cleaned before it comes onto your property.
- Use crop competition to minimize weed establishment. To enable garden crops to compete successfully, use good cultural and management practices. Plant densely within garden rows and mulch between rows to suppress weeds. Because most home gardens have walking spaces around the outside and between rows, competition is less effective in gardens than in home lawns or agricultural fields.
- Support local, state and national weed and seed laws to prevent spread of weeds.

Control practices

No single method of weed control will handle all garden weeds. Normally IWM, a combination of several methods, is necessary for satisfactory garden weed control.

Biological control — plant competition

Biological weed control is reduction of weed growth by living organisms including parasitic insects and diseases that attack a specific kind of weed. Biological control includes foraging by animals as well as competition from desirable plants.

The only practical form of biological weed control for home gardens is competition from garden crops. Although various imported insects and other parasites are used to control weeds in rangeland and noncrop sites, few common garden weeds can be adequately controlled in this way.

Dense, vigorous growth of desirable garden plants is the objective of gardening and the most

economical, productive, risk-free means of controlling weeds. Once established, a vigorous crop can suppress young, newly emerging weeds by shading them and by using the available light, water and nutrients. Gardeners should take advantage of this basic ecological principle by choosing vigorous plants, planting early, eliminating early weed growth, using close row spacing, providing adequate water and fertilizer and controlling insects and diseases. Transplants normally form competitive ground cover more quickly than plants grown from seeds. Fall fertilizing and planting a winter cover crop of a hardy species such as winter rye will result in fewer, weaker weeds right up to the time the cover crop is tilled under in spring.

Irrigation — Overwatering or frequent shallow watering is a primary reason that weeds such as annual bluegrass and groundsel invade gardens. Excess surface moisture promotes seed germination and aids rerooting of weeds that have been pulled or hoed and allowed to lie on the surface.

Proper watering after garden crops have emerged wets the root zone thoroughly (10 to 12 inches deep) then allows the soil to dry for a few days before the next watering. A crop foliage color change to a darker shade of green is a symptom of water deficit and indicates a need for more frequent watering or more water at each irrigation.

Watering a garden on a fixed schedule throughout the growing season will result in excess water in spring and fall, drought in summer or both. Gardens may use an inch or more of water every 3 days in midsummer.

In arid and semiarid climates (less than 20 inches annual precipitation) irrigate in late fall to ensure a moist but not wet soil at planting. Garden plants will emerge quickly from such soil and compete with weeds. Watering also will stimulate early spring germination of weeds, which can be killed by spring garden preparation. Fall irrigation is not necessary in higher rainfall areas. Consult with the Extension agricultural agent in your county to learn water use by crops.

Fertilization — Most home gardens can grow reasonably well with a total annual application of 2 to 4 pounds of available nitrogen (in manure or commercial fertilizer) per thousand square feet of garden. Some crops may require more.

Use the least amount of fertilizer necessary to maintain production. Excess surface nitrogen may stimulate weeds such as annual grasses and may also be leached into groundwater. On the other hand, inadequate nitrogen levels may result in

gradual loss of vigor and premature dying of vegetables.

Some of the nitrogen fertilizer should be applied in early spring to start vigorous garden establishment before weeds emerge. Intensively managed gardens on very sandy soils may require smaller nitrogen fertilizer applications about every 2 months.

Placing a band of fertilizer along the row and mixing it in with a rake will promote crop growth without promoting weed growth between rows.

Samples of soil may be tested for a fee by commercial laboratories or by the University of Idaho Analytical Laboratory. The Extension agricultural agent in your county can provide further information on soil testing and using the results.

Tillage

Tillage is usually the most satisfactory way to destroy weeds in flower and vegetable gardens. Till using a cultivator, rototiller, hoe or spade. Keep your equipment sharp so it cuts off weeds and does not merely push them aside. The primary purpose of tillage is to destroy weeds, but tillage also loosens compacted soil, improves water infiltration and incorporates fertilizer.

Seedlings are very susceptible to cultivation during their first 2 weeks. Until they are old enough to have fully developed root systems and well-protected leaves and stems, it makes no difference whether they are annuals, biennials or perennials; all are equally vulnerable to cultivation.

Established perennials will not be killed by one cultivation, but repeated tillage combined with hand pulling at least every 2 weeks during the growing season will eliminate seed production, reduce growth and eventually kill most perennials in 2 to 4 years.

Hand weeding

Hand weeding is generally the most practical way to control weeds growing close to garden plants or among them. Remove the entire weed (roots and shoots) from the soil because species such as field bindweed will regrow from even small root fragments.

Digging, pulling and cutting well below the plant crown suppresses creeping perennials such as quackgrass and creeping bellflower and will easily control biennials such as bull thistle and simple perennials such as dandelion. Hand weed regularly before the weeds develop flowers.

The best time to pull weeds is after a rain or irrigation when the ground is soft and weeds can be

pulled without breaking their roots. Wait until the ground is dry enough to walk on without sinking in or lay a board or paving blocks to walk on. Remove large weeds after pulling them so they will not take root again.

Rotation

Gardeners should rotate crops just as farmers do. If land availability allows, gardeners should move the vegetable garden from one site to another each year. This helps break the natural life cycles of weeds, insects and diseases. It also allows the soil to recover from compaction caused by foot traffic and spring tillage. If the entire garden cannot be rotated, at least grow a different crop in each part of the garden from year to year.

A rotation that includes fallowing, or omitting crop production for 1 or more years, allows weed control practices not otherwise possible. Frequent thorough tillage, application of needed pesticides, purposeful summer drying, soil fumigation and solarization in summer can reduce populations of weeds and other pests. These practices are especially useful where gardens are badly infested with creeping-rooted perennial weeds such as Canada thistle, creeping bellflower and quackgrass.

Planting a cover crop such as rye that can be rototilled into the soil before spring planting does double duty, suppressing many winter weeds and providing organic matter that improves the soil's physical condition. A grass crop such as rye may be treated with a selective herbicide to kill broad-leaf weeds without being damaged.

Mulching

Organic mulches can be used for both weed control and moisture conservation. Mulches of lawn clippings, straw or compost exclude light, preventing weed seedling emergence and growth. Perennial weeds generally emerge through organic mulch, but annual or biennial weeds do not if the mulch is at least 4 inches deep. Organic mulches may need to be renewed periodically. *Do not use clippings from lawns that have been recently sprayed with a herbicide. Wait until after the second mowing following spraying.* Do not use clippings that include grasses or weeds that have produced seed heads.

Black or other opaque plastic sheets can be used for control of weeds in borders and between rows. Most plastics are effective for only a season because sunlight deteriorates them. Opaque plastic kills weeds by excluding light. Woven mesh plastic excludes light but allows water to pass through to

the soil. Woven plastics are more costly but preferable. They are available at garden stores.

Solarization

In sunny climates, clear plastic can be used to heat the soil of fallow ground by solar radiation. Sunlight passing through the plastic heats the soil, eventually raising the soil temperature enough to kill many soil organisms including seeds, roots and rhizomes of weeds. This procedure, called "solarization," is suitable for fallow ground in garden rotation systems.

To solarize, lay a large sheet of clear plastic over the entire area to be treated and anchor its edges with soil. The soil should be moist to conduct and hold heat, to stimulate weed seed respiration and to prevent plant dormancy. It should be firm to conduct the heat as deeply as possible for maximum weed kill.

The time required to maximize weed kill depends upon the amount of bright, sunny weather and the weed species. The longest days and most direct solar rays occur at the vernal equinox, June 21, so the plastic should be in position by June 1 and left for about 2 months. Soil temperatures will not go as high where there are many cloudy days during treatment, such as where precipitation is more than 20 inches per year, so solarization may need to be extended into midsummer. Solarization will be less satisfactory in such areas.

Solarization before spring planting — Solarization in late winter and early spring can reduce weed populations before planting. It is not as effective as late-spring and summer solarization, but it can be done each year without losing a season of production.

Till the garden soil and prepare the seedbed in autumn. Place clear plastic over the garden in mid-winter or soon after snowmelt. Solar heat will warm the soil under the plastic whenever the days are warm and sunny, causing weed seeds to germinate. Sprouted weeds will die as daytime temperatures under the plastic rise high enough to kill them (110° to 130°F depending on plant size and species). Weeds may also die from freezing on very cold nights.

Leave the plastic in place until planting to continue solarization as long as possible. Because tilling the soil after removing the plastic brings more weed seeds near the soil surface, plant without further tillage.

This system depletes the weed seed supply in the seed germination zone. It also leaves the garden

soil drier and warmer than normal in spring, allowing earlier planting of garden crops.

Most weed seeds that escape solarization will emerge after the garden crops do. By that time, the garden plants will have become large enough to dominate the late-germinating, smaller weeds and will be much easier to distinguish and destroy during hand weeding or cultivating.

Chemical control

Chemical control requires less human energy than cultivation or hand weeding in large or commercial gardens and in most cases will be effective longer.

Herbicides — Herbicides are pesticides used to kill plants without harming other kinds of organisms. Use of most herbicides is not practical in small home gardens because (1) many different kinds of garden plants grow very close to one another, making it nearly impossible to avoid contacting a garden crop for which the herbicide is not registered, (2) herbicide label restrictions on crops that may be planted the year after treatment complicate year-to-year crop rotations and (3) small home gardens aren't big enough to make the herbicide effort worthwhile for most people. The time and effort involved in mixing, spraying and cleaning equipment may exceed the time and effort required to pull or hoe weeds in a small garden.

Although some herbicides may be used in home gardens, residues of most herbicides persist too long to safely plant many other crops afterward. Our experience shows that persistent herbicides used by gardeners inexperienced with herbicides cause many instances of injury to the next year's garden.

Although herbicide use is the only feasible weed control practice for some perennial weeds, non-chemical weed control methods should be relied upon as a general rule in small gardens. Herbicides should be used only by trained or experienced individuals or people under their guidance. For information on specific herbicides available for garden use, see University of Idaho CIS 897, *Herbicides for Garden Weed Control*.

Fumigants — Gardens that are planted on sites badly infested with roots of perennial weeds may be ruined by those weeds. Rehabilitation of such

gardens may require prohibitive labor and control costs each year, far into the future. These costs can be avoided by soil fumigation in some circumstances.

Soil fumigation, like solarization, is a form of temporary soil sterilization. Most soil fumigants are nonselective biocides. The vapors of soil fumigants move throughout almost all of the upper layer of soil, destroying weed roots and many weed seeds. They can markedly reduce soilborne insects, nematodes and disease organisms. A single soil fumigation is costly and troublesome compared with a single year of weed control by other practices, but may be economical in the long term.

Correct management of fumigated areas includes measures to avoid or stop reinvasion of the treated areas by weeds. This may require treatment of peripheral areas with other practices to stop weed seed production as well as placement of an 18-inch-deep edging as a barrier against creeping roots.

After fumigant application, the soil must be covered or sealed for a few days to allow the fumigant to take effect, after which the soil is aerated by tillage to allow the fumigant to escape. The fumigant must be allowed to dissipate, generally for several weeks, before the soil is safe to plant.

People and animals must be kept from the treated area from the time the fumigant is applied until the soil has been aerated. Fumigants are toxic to many life forms and are dangerous if inhaled in large enough amounts. The odor of even very small concentrations of fumigants is unpleasant enough to cause people and animals to leave the area without delay, but adequate safeguards should be taken nonetheless.

Fumigants may kill roots of nearby shrubs and fruit trees. Don't fumigate until you are sure no such roots are present.

Fumigants that can be used in gardens are sold only to licensed applicators and require special application equipment. Professional applicators should be consulted to determine the suitability of a site for fumigation.

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Additional reading for home gardeners

Number	Title	Price
CIS 218	Vegetable Varieties for Idaho Gardens	.35
CIS 267	Early Tomatoes	.25
CIS 283	Soil Sterilization Methods for the Home Gardener	.25
CIS 370	Tomatoes for Southeastern Idaho	.25
CIS 431	Growing Tomatoes in Cool Summer Areas	.35
CIS 532	Propagating Ornamental Trees and Shrubs	.35
CIS 628	Insects and Mites Destructive to Berries	.35
CIS 640	Ida-Gold — A New Ultra-Early Tomato Cultivar	.25
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CIS 662	Gardening — Growing Sweet Corn	.35
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CIS 676	Potatoes in the Home Garden	.25
CIS 679	Making and Using Compost	.35
CIS 686	Gardening — Growing Garlic	.25
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CIS 799	Vegetable Gardening — Growing Melons	.35
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CIS 815	Northern Idaho Fertilizer Guide: Blueberries, Raspberries, Strawberries	.35
CIS 821	Strawberry Culture in Northern Idaho	.35
CIS 837	Mulches for the Home Landscape and Garden	.35
CIS 897	Herbicides for Garden Weed Control	.35
PNW 170	Propagating Plants from Seeds	.25
PNW 320	Calibrating and Using a Backpack Sprayer	1.00
EXT 419	Raspberry Growing in Idaho	.50
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