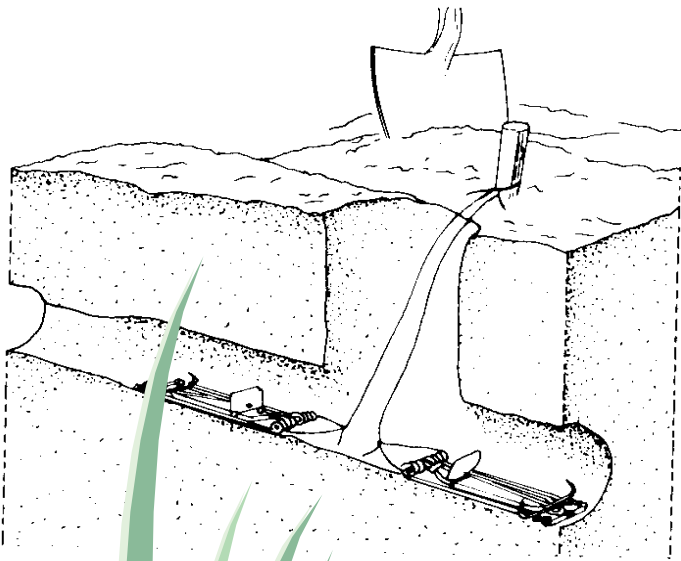


# Top Ten Pests in Gardens and Landscapes & How to Control Them



[www.ipm.ucanr.edu/QT/](http://www.ipm.ucanr.edu/QT/)

# Ants

**Although ants are annoying when they come indoors, they can be beneficial by feeding on fleas, termites, and other pests in the garden.**

While spraying chemicals inside the house might seem effective, doing so won't prevent more ants from entering your home. Because most ants live outdoors, focus efforts on keeping ants from entering buildings. Combine several methods such as caulking entryways, cleaning up food sources, and baiting when necessary. Avoid using pyrethroids (e.g., bifenthrin and cypermethrin), especially on hard surfaces such as driveways or sidewalks or around the foundation of buildings. These products pollute waterways.

## Make your house less attractive to ants.

- ◆ Caulk cracks and crevices that provide entry into the house.
- ◆ Store food attractive to ants in closed containers.
- ◆ Clean up grease and spills.
- ◆ Ant-proof kitchen garbage pails with sticky barriers such as petroleum jelly under the lip and place pet dishes in a moat of water.
- ◆ Remove or manage sweet food sources next to your house such as aphid-infested bushes and ripened fruit on trees.
- ◆ Keep plants, grass, and organic mulch at least a foot away from the foundation of buildings to reduce ant foraging and nesting.

## When ants invade your house:

- ◆ Sponge up invading ants with soapy water as soon as they enter.
- ◆ Plug up ant entryways with caulk.
- ◆ Take infested potted plants outdoors and submerge pots in a solution of insecticidal soap and water.
- ◆ Clean up food sources by wiping up spills or placing food in tight-fitting containers.
- ◆ Rely on outdoor baits to control the ant colony.
- ◆ Insecticide sprays shouldn't be necessary.
- ◆ If you hire a pest control company, ask them to use baits and spot treatments rather than perimeter treatments or monthly sprays.



## How baits work:

Pesticide baits work by attracting worker ants who then take the product back to the nest where the entire colony, including queens, can be killed. The pesticide must be slow acting so workers won't be killed before they get back to the nest.

## How to use baits:

Place baits near ant trails and nest openings. Prepackaged or refillable bait stations or stakes are the safest and easiest to use. Active ingredients in baits may include boric acid/borate, fipronil, avermectin, or hydramethylnon. Liquid borate (0.5-1% borate in sugar water solution) baits in refillable bait stations are best for severe Argentine ant infestations. Replace baits when empty and reposition them, or try a different bait product if ants don't appear to be taking it. It can take 5 to 10 days to see fewer ants.

See [www.ipm.ucanr.edu/ants](http://www.ipm.ucanr.edu/ants) for more details.



Argentine ant; actual size is  $\frac{1}{8}$  of an inch. —

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# Aphids

**Almost every plant has one or more aphid species that occasionally feed on it, but low to moderate numbers of aphids usually aren't damaging to gardens or landscape trees.** Although aphids can curl leaves and produce sticky honeydew, they rarely kill plants and you usually can wash them off with water. When aphid numbers get high, natural enemies frequently feed on them, eliminating the need for pesticides. When pesticides are necessary, use less toxic products such as insecticidal soaps and oils.

## Aphids are common in your garden because:

- ♦ Aphids like lush new growth so don't over fertilize. Use organic or slow-release products.
- ♦ Aphids build up on flowering plums, roses, tulip trees, crape myrtles, apples, and many vegetables. Expect aphids when you grow these plants.
- ♦ Ants protect aphids from their natural enemies. Keep ants off plants to help beneficials do their job.

## To reduce aphids:

- ♦ Prune out infested leaves and stems.
- ♦ Knock aphid populations off plants by shaking the plant or spraying it with a strong stream of water.
- ♦ Protect seedlings with covers or aluminum foil mulches.
- ♦ Wait for hot weather; most aphids are heat-intolerant and will be gone by mid-June.

## Protect aphids' natural enemies:

- ♦ Lady beetles (lady bugs), both adults and larvae;
- ♦ Lacewings;
- ♦ Syrphid fly larvae;
- ♦ Soldier beetles; and
- ♦ Parasitic mini-wasps that turn aphids into crusty mummies.

Beneficial insects such as lady beetles and lacewings will come into your garden naturally when aphids are abundant. Protect these good bugs by avoiding the use of insecticides that can be toxic to a broad variety of insects.



## If insecticides seem necessary, use the safest products.

- ♦ Use nonchemical pest control methods first to manage aphid populations. However, if you feel insecticides are necessary, choose less toxic products.
- ♦ Insecticidal oils and soaps are the safest products. When properly used, these materials solve most problems.
- ♦ Oils and soaps work by smothering aphids, so apply these products thoroughly. Don't apply them to drought-stressed plants or when it is very hot. A few plants are sensitive to these products.
- ♦ Apply insecticidal soaps, soap-pyrethrum mixtures, or neem oils on vegetables or small bushes such as roses.
- ♦ Narrow range horticultural oils—such as supreme or superior oils—are appropriate for larger trees.
- ♦ Oils and soaps don't kill aphids hidden within curled leaves. Prune these out. Systemic insecticides can kill hidden aphids, but they are much more toxic and might kill honey bees and parasites on flowering plants.

**See Pest Notes: Aphids**  
at [www.ipm.ucanr.edu](http://www.ipm.ucanr.edu) for more details.



Green peach aphid colony.



A healthy aphid is flanked by mummified aphids killed by parasitic wasps.

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# Asian Citrus Psyllid and Huanglongbing Disease

**The Asian citrus psyllid and the deadly bacterial disease it spreads, Huanglongbing (HLB), threaten citrus trees in backyards and on farms.** The psyllid arrived in Southern California in 2008, and HLB disease was first detected in Los Angeles in 2012. All types of citrus—including oranges, grapefruit, lemons, and mandarins—are affected as well as a few closely related ornamentals.

## What are some of the concerns?

- ◆ The Asian citrus psyllid carries HLB disease from tree to tree.
- ◆ HLB disease will kill citrus trees in as little as five years.
- ◆ There is no cure or effective control method for HLB disease.

## Inspect your citrus trees for psyllids.

- ◆ Reducing the psyllid population helps to slow the spread of HLB disease.
- ◆ From spring through fall, check trees monthly and look for psyllid eggs, nymphs, and adults on newly forming leaves.
- ◆ Adults are about the size of an aphid and have brownish mottled wings. They feed with their head down and their “tail” in the air.
- ◆ Nymphs are tiny and yellowish, and they excrete white waxy tubules.
- ◆ Psyllids feed on plant sap and produce sticky honeydew that may be covered with black sooty mold. However, other citrus pests (e.g., aphids and soft scales) may cause this symptom too.
- ◆ Although this psyllid can damage leaves, it doesn’t kill trees by itself; and the fruit is safe to eat.

## What are the symptoms of HLB disease?

- ◆ Leaves show an asymmetrical yellow mottling with patches of green.
- ◆ Fruit are small, lopsided, and fall off the tree easily, and the juice tastes bitter.

## What should you do if you think you have the Asian citrus psyllid or HLB disease?

- ◆ Contact your agricultural commissioner’s office, or call the California Department of Food and Agriculture (CDFA) Exotic Pest Hotline at 1-800-491-1899 to confirm a find.



## How can I manage the psyllid and disease?

- ◆ Plant trees from reputable nurseries to avoid bringing either the insect or HLB into your yard.
- ◆ Learn where you are relative to quarantines. Don’t move citrus plants or clippings out of infested areas because doing so can spread the insect and disease.
- ◆ Parasitic wasps that attack Asian citrus psyllids have been released in some areas. These wasps will help to reduce psyllid numbers but aren’t likely to stop the spread of HLB disease.
- ◆ You can reduce psyllid numbers by treating infested trees with insecticides including oils, soaps, carbaryl, or systemic imidacloprid. Oils and soaps don’t last long, so they need to be reapplied every few weeks. Carbaryl and imidacloprid are longer lasting; but because both are toxic to bees, don’t use these products when citrus trees are in bloom. Make sure foliar-applied insecticides reach the new growth where young psyllids hide.
- ◆ Only apply pesticides if psyllids have been found on your trees.
- ◆ When HLB is detected, diseased trees must be removed to protect the trees around them from becoming infected.

See *Pest Notes: Asian Citrus Psyllid and Huanglongbing Disease* at [www.ipm.ucanr.edu](http://www.ipm.ucanr.edu) for more details.



Brownish adult, yellow nymphs, and white wax of Asian citrus psyllids (left). Symptoms of HLB on leaves and fruit (right).

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# Gophers

## Gophers are small burrowing rodents that feed on roots of many types of plants.

A single gopher can ruin a garden in a short time, and gopher gnawing can damage irrigation lines and sprinkler systems. In lawns, their mounds are unsightly and interfere with mowing. Early detection is critical to prevent damage. Use both traps and underground fencing to manage gopher problems. Toxic baits are available but can pose threats to wildlife, pets, and children, especially in backyard situations.

## Keep your eye out for gopher mounds.

- ◆ Gophers spend almost all their time underground in their burrow and aren't commonly seen.
- ◆ Look for mounds of loose dirt that are half circles or crescent-shaped with a plugged hole that is off to one side of the mound.
- ◆ Fresh mounds are the sign of an active gopher. A single gopher can create several a day.
- ◆ In contrast to gopher mounds, mole mounds are circular with a plug in the middle, and ground squirrel holes are unplugged without a mound.

## Protect plants with underground fencing.

- ◆ Lay hardware cloth or  $\frac{3}{4}$ -inch mesh poultry wire under raised beds before planting.
- ◆ Wire baskets to protect individual shrubs or trees can be installed at planting, leaving enough room for roots to grow.

## Use traps to reduce the gopher population.

- ◆ Gopher traps are placed underground, inside the gopher burrow, so you must use a gopher probe to locate the burrow.
- ◆ Be sure to place traps in active burrows as indicated by fresh mounds.
- ◆ Two common types of traps are pincer traps and box traps.
- ◆ Set traps in tunnels in pairs facing each other.
- ◆ Cover the hole so light doesn't get in.
- ◆ Check traps often and reset as necessary.
- ◆ Keep trapping until no new mounds are formed.
- ◆ Gopher traps don't require food baits.



## Avoid products and methods that aren't proven.

- ◆ Although many predators feed on gophers, installing owl boxes is unlikely to reduce gopher numbers enough to prevent damage.
- ◆ No repellents currently sold successfully protect plants from gophers.
- ◆ Plants such as gopher purge, castor bean, and garlic haven't been shown to repel gophers from an area.
- ◆ Frightening devices such as vibrating stakes, ultrasonic devices, and wind-powered pinwheels haven't been effective in research trials.
- ◆ Fumigation with smoke or gas cartridges isn't effective, because gophers can seal off their burrows rapidly.

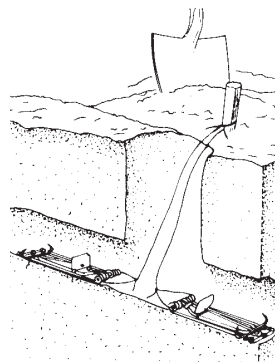
See Pest Notes: *Pocket Gophers* at [www.ipm.ucanr.edu](http://www.ipm.ucanr.edu) for more details.



Adult gopher.



Typical crescent-shaped gopher mound.



Place gopher traps facing one another in tunnels.

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# Leaf-feeding Caterpillars

**Caterpillars, the larvae of butterflies and moths, damage plants by chewing on leaves, flowers, shoots, and fruit and sometimes by boring into wood.** Caterpillars in fruit or wood can be difficult to manage: they are hidden most of their life and can cause serious damage even when numbers are low. However, many plants, especially perennials, can tolerate substantial leaf damage, so a few leaf-feeding caterpillars often aren't a concern. Handpicking and natural enemies often provide sufficient control.

## Early detection and removal prevent excessive damage.

- ♦ Look for feeding holes, excrement, webbed or rolled leaves, caterpillars, eggs, and natural enemies.
- ♦ Prune off rolled or webbed leaves, and handpick caterpillars from plants, destroying the insects by crushing them or by dropping them into soapy water.

## Caterpillars have many natural enemies.

- ♦ Beneficial insects and other organisms often prevent caterpillar numbers from rising to damaging levels.
- ♦ Most caterpillar species have several species of parasitic wasps or flies that attack them. Look for parasite cocoons next to caterpillars, darkened caterpillar eggs, or exit holes in dead caterpillars.
- ♦ General predators include birds, assassin bugs, lacewings, predaceous ground beetles, and spiders.
- ♦ Naturally occurring diseases caused by viruses, bacteria, or fungi often kill caterpillars.

## Less toxic insecticides are available:

- ♦ Use insecticides only when damage is becoming intolerable, nonchemical methods haven't worked, and smaller caterpillars are present. Avoid insecticides that can kill beneficial insects, and don't treat butterfly garden plants, because you'll kill the caterpillars that will become butterflies.
- ♦ *Bacillus thuringiensis* subspecies *kurstaki* (Btk) is a microbial insecticide that kills only caterpillars. It's safe to use near bees, beneficial insects, and wildlife. Caterpillars must feed on treated leaves to be affected. Because it's most effective on small, newly hatched caterpillars and breaks down rapidly, treatment timing is critical.
- ♦ Spinosad is a safe microbial-based insecticide, but it can have some negative impacts on beneficial insects.



## Some common leaf-feeding caterpillar species:



**Beet armyworm** is a common pest on vegetables and flowers. Yellow-striped armyworm is similar but dark with yellow and orange stripes.



A **parasitic wasp** lays her egg in an armyworm. The egg will hatch into a larva that will feed inside the armyworm and kill it.



**Tobacco hornworm** on tomato. Note its excrement on the leaf below.



The **western tussock moth** feeds on many ornamental and fruit tree species.



Leafrollers, such as this **fruittree leafroller**, feed inside leaf rolls secured with silk and, when disturbed, often drop to the ground, hanging from a silken thread.



The **cabbage looper** has three pairs of prolegs in the back and a reduced number in the middle, causing it to move in its typical looping pattern.



**Fall webworms** feed in groups within silken tents. Many tent caterpillars create similar nests. Prune these out and destroy them.



Egg cluster and newly hatched larvae of the **redhumped caterpillar**. As these larvae mature they will develop a bright red hump just behind their head.

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# Peach Leaf Curl

**Peach leaf curl is a fungal disease that affects only peach and nectarine trees.** Distorted, reddened foliage in the spring is a distinctive symptom. New leaves and shoots thicken and pucker and later may die and fall off. An infection that continues untreated for several years can lead to a tree's decline. To prevent peach leaf curl, treat peach and nectarine trees with a fungicide every year after leaves fall. Treatment in spring, after symptoms appear, won't be effective. When planting, consider peach varieties resistant to the disease.

## Look for symptoms in spring.

- ♦ New leaves and shoots redden and pucker. Leaves may yellow or be covered with powdery gray spores; they also might drop.
- ♦ Cool, wet spring weather prolongs disease development.
- ♦ A second set of normal leaves will replace fallen leaves, and tree growth will appear normal after weather turns dry and warm (79° to 87°F), although spores that can infect next year's growth may remain.
- ♦ Symptoms won't appear later in the season.

## Treat trees with a fungicide in late fall and winter.

- ♦ Treat just after leaves have fallen, usually late November or December.
- ♦ A second application in late winter just before buds swell is advisable, especially in areas with high rainfall or during wet winters.
- ♦ Don't apply fungicides during the growing season, because they won't be effective.

## Choose effective fungicides.

- ♦ The safest effective products available for backyard trees are copper soap (copper octanoate) or the fixed copper fungicide—copper ammonium.
- ♦ Apply either of these copper products with 1% spray oil to increase effectiveness.
- ♦ Bordeaux mixture is a homemade copper sulfate and lime mixture that must be carefully mixed up just prior to treatment. For a recipe, see Pest Notes: *Bordeaux Mixture* at [ipm.ucanr.edu](http://ipm.ucanr.edu).
- ♦ The synthetic fungicide chlorothalonil is also effective.



## Make fungicide applications effective and safe.

- ♦ The fungal spores that cause the disease germinate in the spring and spend the winter on twigs and buds.
- ♦ When you spray a fungicide, thoroughly cover all branches and twigs until they are dripping so all spores are killed.
- ♦ All peach leaf curl fungicides have environmental and health risks. Wear protective clothing, and follow label directions to stop drift or runoff.
- ♦ After many years of use, copper ions from copper-based fungicides can accumulate in soil. This can harm soil microorganisms and, through runoff, aquatic organisms. Take care when using these materials to avoid excessive runoff.

See Pest Notes: *Peach Leaf Curl*  
at [ipm.ucanr.edu](http://ipm.ucanr.edu) for more details.



Leaf curl symptoms on foliage.

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# Rats

**Rats are some of the most troublesome and damaging rodents.** They eat and contaminate food, garden produce, and fruit, and transmit diseases to humans and pets. Manage rats by removing food and shelter, eliminating entryways into buildings, and trapping.

## Indications of a rat infestation:

- ◆ Rat droppings in garages, storage buildings, or attics, or around pet food containers.
- ◆ Rodent feeding damage on tree fruit or nuts in your yard.
- ◆ Rat nests behind boxes, in garage drawers, or in woodpiles.
- ◆ Burrows beneath garbage cans and compost piles or among garden plants.
- ◆ Rats traveling along utility lines or on fence tops at dusk.

## Is it a Norway rat or a roof rat?

- ◆ The stocky Norway rat builds burrows along building foundations, beneath rubbish, or in woodpiles. Indoors they tend to remain in basements or on the ground floor.
- ◆ Roof rats are agile climbers with a tail longer than their head and body. They usually live and nest above ground in shrubs, trees, or dense vegetation. Indoors they favor attic spaces, walls, false ceilings, and cabinets.

## To get rid of rats, remove food, water, and shelter, and seal entryways!

- ◆ Feed pets only the amount of food they will eat at a single feeding or bring food inside at night.
- ◆ Keep garbage, trash, and garden debris in receptacles with tight-fitting lids.
- ◆ Thin dense vegetation and create at least a 2-foot space between each shrub as well as between shrubs and buildings.
- ◆ Thin or remove climbing hedges from buildings.
- ◆ Remove tree limbs that are within 3 feet of a roof.
- ◆ Seal all cracks and openings in the house's foundation that are larger than ¼ inch.
- ◆ Make sure doors, windows, and screens fit tightly.



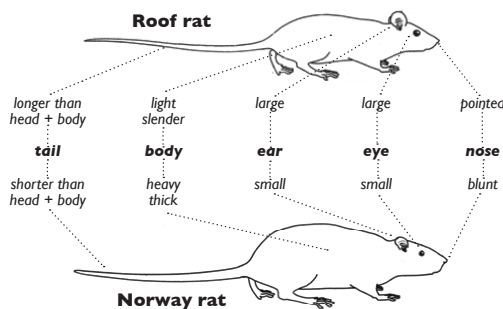
## Remove rats from the home by trapping.

- ◆ Snap traps are the safest, most effective, and most economical way to trap rats.
- ◆ For Norway rats, place traps close to walls, behind objects, in dark corners, and in places where you have found rat droppings.
- ◆ For roof rats, place traps in off-the-ground locations such as ledges, shelves, branches, fences, pipes, or overhead beams.
- ◆ Ensure traps are out of reach of children and pets.

## What about baits?

- ◆ Avoid using baits indoors, because dead rats create bad odors.
- ◆ Seal buildings before baiting outside to prevent poisoned rats from coming inside to die.
- ◆ Tamper-proof bait stations are available but can only be used within 50 ft. of a building.
- ◆ All rodent baits are toxic to nontarget species, pets, and humans. Always keep away from children and pets.

See Pest Notes: Rats  
at [www.ipm.ucanr.edu](http://www.ipm.ucanr.edu) for more details.



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# Scales

**Scale insects suck plant juices and are pests of many trees and shrubs.** Infestations can cause yellowing or premature dropping of leaves, sticky honeydew, and blackish sooty mold. Plant parts can distort or die back, depending on the species and abundance of scales. Management includes proper plant care, conserving natural enemies, and applying low-toxicity insecticides when needed. Most plants tolerate low to moderate numbers of scales.

## Damage resembles that of aphids and whiteflies.

- ♦ Abundant sticky honeydew excreted by soft scales and certain other species.
- ♦ Black sooty mold growing on the honeydew.
- ♦ Discolored, distorted, or dying leaves, twigs, or branches, especially with armored scales.

## Recognize scales:

- ♦ Circular, elongate, or oval discolorations or raised areas on bark, leaves, or fruit.
- ♦ Immobile or slow-moving bodies or coverings  $\frac{1}{25}$  to  $\frac{1}{4}$  inch long that lack an obvious head or appendages and don't resemble most other insects.

## Distinguish the two most common types of scales—soft and armored.

- ♦ Armored scales are tiny and flat, have covers that usually can be removed from the body, and don't secrete sticky honeydew. Common species include San José scale and California red scale.
- ♦ Soft scales are larger, excrete honeydew, and are more rounded and convex with covers that don't lift off. Common species include black scale, lecanium scale, and brown soft scale.
- ♦ Learn the species or family name of your scale so you can identify effective controls.
- ♦ A popular systemic insecticide, imidacloprid, controls most soft scales but not armored scales; and it causes outbreaks of cottony cushion scale.

**To reduce problems, use an integrated program.**

- ♦ Provide plants with proper cultural care, especially irrigation.
- ♦ Encourage scale natural enemies. Look for predators such as lady beetles or lacewings and parasite emergence holes in scale covers.
- ♦ Use sticky barriers or insecticide baits to selectively control scale-tending ants.
- ♦ Consider replacing problem-prone plants. Most scales are highly specific to certain plants.

## What about insecticides?

- ♦ Don't treat unless you have an intolerable or damaging problem.
- ♦ Avoid insecticides that injure natural enemies.
- ♦ For fruit trees and smaller plants, make a well-timed and thorough spray using horticultural oil during the dormant season or when scale crawlers are active in the growing season.
- ♦ For intolerable soft scale problems, especially on large trees, consider soil-applied imidacloprid. This material isn't effective against some scales, including armored scales.

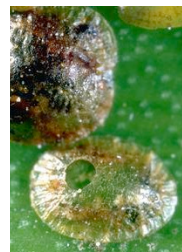
**See Pest Notes: Scales at [www.ipm.ucanr.edu](http://www.ipm.ucanr.edu) for more details.**



California red scale, an armored scale.



Brown soft scale.



Exit hole in soft scale indicating parasitization.

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# Snails & Slugs

**Snails and slugs rank among our most despised garden pests.** These slimy mollusks emerge from hiding at night and chew holes in leaves and flowers of many succulent garden plants and fruit. Slugs and snails are similar in structure and biology, except slugs lack the snails' external spiral shell. Management requires a vigilant and integrated approach that includes eliminating moisture and hiding spots, trapping, setting up barriers, and handpicking. Baits can be helpful but by themselves don't provide adequate control in gardens that contain plenty of shelter, food, and moisture.

## How do you know snails and slugs are causing damage?

- ◆ You might not observe these pests at first, because they feed at night and hide during the day. Go out at night or in the early morning to view them in action.
- ◆ Other pests can cause holes in leaves, flowers, and fruit. Look for the shiny, slimy trails slugs and snails leave behind.

## What must be done to reduce snails and slugs?

- ◆ Remove daytime hiding places—ivy, weedy areas, debris, and boards.
- ◆ Regularly remove snails from shelters you can't eliminate such as low ledges on fences, undersides of decks, and meter boxes.
- ◆ Place traps in your garden and dispose of trapped snails and slugs daily.
- ◆ Reduce moist surfaces by switching to drip irrigation or sprinkling in the morning rather than later in the day.
- ◆ Consider snail-proof plants such as impatiens, geraniums, begonias, lantana, nasturtiums, and many plants with stiff leaves and highly scented foliage such as sage, rosemary, and lavender.

## How can I manage snails and slugs without using pesticides?

- ◆ Make sure the garden is mollusk-free before planting. Then erect a copper barrier around it. Use a 4- to 6-inch wide band of copper, buried an inch below the soil and bent over at the top or attached around the edge of a raised bed.
- ◆ Place your garden in the sunniest spot possible. Remove garden objects or adjacent plants or ground cover that can serve as shady shelter. Reduce moist surfaces as much as possible.
- ◆ Build a trap using a 12- by 15-inch board raised off the ground by 1-inch runners. As mollusks collect under the board, scrape them off and destroy daily.

## What about baits?

- ◆ Baits won't be very effective unless you also remove shelter, food, and moisture.
- ◆ Metaldehyde baits are especially poisonous to dogs and birds. Metaldehyde also loses its effectiveness rapidly in sunlight and after rain or irrigation.
- ◆ Iron phosphate baits are safe for use around dogs, children, and wildlife.
- ◆ Irrigate before applying bait and apply in the evening on warm days when mollusks are active.
- ◆ Scatter, don't pile, bait around sprinklers and in moist, protected areas where mollusks travel.

See **Pest Notes: Snails and Slugs** at [www.ipm.ucanr.edu](http://www.ipm.ucanr.edu) for more details.



Use a board that is raised off the ground about an inch to trap snails daily.



Slugs and their damage.

**Minimize the use of pesticides that pollute our waterways. Use nonchemical alternatives or less toxic pesticide products whenever possible. Read product labels carefully and follow instructions on proper use, storage, and disposal.**

For more information about managing pests, contact your **University of California Cooperative Extension office** listed under the county government pages of your phone book or visit the UC IPM Web site at [www.ipm.ucanr.edu](http://www.ipm.ucanr.edu).

**What you use in your landscape affects our rivers and oceans!**

# Weeds in Landscapes

**Nothing disturbs tidy gardeners more than a weed filled flower or landscape bed.** Weeds will invade any bare or thin area in a landscape. Prevent invasions in new beds with good site preparation. Keep weeds out with an integrated program that includes competitive plants, mulches, and hand removal. Be particularly vigilant about removing aggressive perennial weeds. You should rarely need herbicides in established landscape plantings.

## Before and right after you plant:

- ◆ Prepare the site and control existing weeds.
  - Dig out weeds or remove by hand. Follow up by irrigating then removing newly emerged weed seedlings right before planting.
  - Solarize the soil if conditions allow.
  - If necessary, use glyphosate or other systemic herbicides for difficult-to-control perennial weeds.
- ◆ Evaluate your soil and amend if needed. Make sure new soil comes from a reputable source and doesn't contain weed seeds.
- ◆ Establish new plantings as quickly as possible to cover bare areas and shade out weeds.
- ◆ Consider drip irrigation in permanent plantings.
- ◆ Apply mulches.

## Mulch is the key to weed-free landscaping.

- ◆ Mulches prevent weed seed germination by blocking sunlight. Be sure to properly apply mulch and replenish it to maintain its effectiveness.
- ◆ Organic mulches (e.g., wood chips, bark chips, compost): Attractive but must be replenished. Choose a medium-sized mulch ( $\frac{3}{4}$  inch) and maintain it at an adequate depth (3 to 4 inches).
- ◆ Natural inorganic mulches (e.g., sand, gravel, pebbles): More stable than organic mulches, but difficult to keep clean.
- ◆ Landscape fabrics: Porous and long lasting; vary in how long they remain effective. Cover with organic mulch.
- ◆ Black plastic: Not preferred since it can restrict air and water movement and promote root rots.



## When weeds invade your landscape:

- ◆ Remove small weeds by hand before they flower and set seed.
- ◆ Use a dandelion knife or similar tool to dig up and destroy all roots and underground parts of perennial weeds without disturbing the soil.
- ◆ Use shallow cultivation or hoeing to remove annual weeds from ornamental plantings.
- ◆ Consider devices such as string trimmers for large landscapes.
- ◆ Apply mulch to weed-free areas to prevent further invasions, and regularly remove new weeds as soon as they emerge.

## When are herbicides necessary?

- ◆ In general, existing landscape plantings don't need herbicides; hand weeding and mulching usually provide adequate control.
- ◆ Use herbicides for special-problem situations before establishing new plantings or for difficult-to-control perennial weeds.
- ◆ Herbicides can injure desirable plants in the landscape, so use these products with great care.

See **Pest Notes: Weed Management in Landscapes** at [www.ipm.ucanr.edu](http://www.ipm.ucanr.edu) for more details.



spotted spurge



bermudagrass

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