

Natural Pest Control

This chapter is for the land managers, gardeners and homeowners that not only want a pest-free landscape, but a chemical-free one as well—a landscape that is as good for them as for all the creatures that interact with it.

Many of the pests ravaging Southern California are listed below. A brief description is provided for each pest and includes the cultural, physical and biological remedies for its control.

Pest Free Landscapes

No landscape is pest-free, but some are more trouble-free than others. More likely than not, landscapes with fewer pests have some of the characteristics listed below:

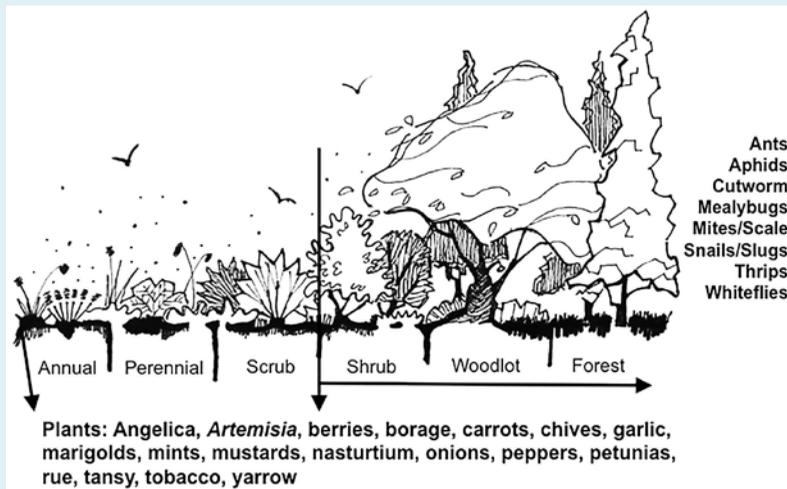
- **Plant Compatibility:** One of the surest ways to reduce pests is to make sure that the plants chosen for the landscape are compatible with the environment and irrigation goals.
- **Good Horticultural Practices:** Irrigating correctly, pruning judiciously and at the right time, and fertilizing only when necessary will ensure plant health, which in turn reduces pest problems.
- **Cleanliness:** A common denominator for pest reduction is cleanliness. The places where pests live and breed have been eliminated. Old wood and leaf piles are removed; overgrown weedy areas are mowed and raked; and areas of storage are pulled out, swept and restacked.
- **Horticultural Diversity:** Having many different types of plants in a landscape ensures that if one plant gets infested, the entire landscape is not at risk. Horticultural diversity also reduces the likelihood of nutrient depletion and damage from climatic extremes.
- **Successional Diversity:** Succession is the process of one type of plant community transitioning to another type. Higher succession plants that have longer lives benefit from having shorter-lived, lower succession plants around them. See the explanation in the sidebar further on.
- **Know When to Quit:** Change is the only constant in living systems, and a landscape is a living system. It is always growing and evolving. What once was full sun may now be shade and soils originally alkaline may become acidic. Plants not compatible to evolving conditions will show signs of stress and pest infestation. At this point, just quit; instead remove the plant and replace it with one that is more compatible.

Successional Diversity

Successional trajectory is a theoretical model used to explain how landscapes recover from a disturbance, such as fire or flood. As an example: if a wildfire devours a forest, the forest would eventually return, but it would do so by a series of successions. The first plants to sprout after the fire would be the opportunists and pioneers, the low-succession annuals and biennials. The next succession would be the perennials, followed by scrub, shrub, mixed evergreen, and finally returning to forest.

In Southern California many of our most noxious pest problems occur on the longer-lived, higher-succession plants (food crops are an exception)—but the plants recommended to combat the pests, either by repelling them or attracting their predators, are lower-succession and shorter-lived. Simply put: Higher-succession plants are healthier when accompanied by lower-succession plants.

Lower-succession plants provide more benefits than just pest control and should be a part of every landscape. The reason they are not used more is because of their maintenance. These shorter-lived plants need more cleaning, pruning, removing and replanting. However, the benefits of having these plants outweigh the change in (extra) maintenance. For a list of low-succession, beneficial plants see the section on Companion Plants at the end of this chapter.



Using lower succession plants along with higher succession ones will help the landscape defend itself against pests. Lower succession plants attract beneficial insects, repel unwanted insects, and/or trap unwanted insects.

List of Pests

The list below has been separated into two parts: Animal pests and diseases/fungal pests. These lists been compiled over decades, including over 14 years at the Lyle Center for Regenerative Studies, Cal Poly Pomona. It also incorporates the work from the following publications:

- *California Master Gardener Handbook*. Dennis R. Pittenger Editor. University of California: Agriculture and Natural Resources. Publication 3382. 2002.
- *Pests of Landscape Trees and Shrubs: An Integrated Pest Management Guide*. Steve H. Dreistadt and Mary Louise Flint (Editor). University of California: Agriculture and Natural Resources. Publication 3359.
- *Best Management Practices for Vegetation Management* (revised). Bell, Carl and Dean Lehman. Ellen Mackey, editor. Los Angeles Weed Management Area. 2015.

Animal Pests

Ants: Barriers such as sticky tape and roofing tar are good for keeping ants out of shrubs and trees. Lemon juice is a good deterrent when poured in the cracks ants occupy or travel in. Spearmint sprays (spearmint pureed, strained, and then added to 2 parts water) can be sprayed on the infected areas. Soap sprays (1 to 4 tablespoons per gallon of water) are used the same way as the spearmint sprays. Creating barriers around plants with diatomaceous earth works well. You can also plant catnip, pennyroyal, spearmint, southernwood or tansy to repel ants.

Aphids: Attracted to new growth and flowering parts, aphids prefer nutrient-rich leaves and humid environments. To deter them reduce the use of fertilizers and water, and prune to encourage airflow. Dislodge and disrupt aphids from foliage with a strong jet of water. The best homemade remedy is a soap spray (1 to 4 tablespoons per gallon of water). Other effective remedies include teas made from tobacco, onion, garlic, and shallots. Simply controlling ants can also reduce aphid population size. Plant angelica, chives, coriander, garlic, mustards, nasturtium, onions, petunias, southernwood, or spearmint as repellents. Encourage ladybug; their larvae devour aphids.

Black Widow Spiders: Preferring cool dark environments, these venomous spiders are found in wood and rubbish piles, underneath stilted structures, and inside irrigation boxes. Remove debris and clutter from around a structures. Never, ever, stick your hand into a dark place without sweeping the area first.

Cats: To deter cats from hunting, sleeping, and using the landscape as a restroom, make it as uncomfortable for them as possible. Lay thick, woody mulches over the area. Shield sandy play areas with palm fronds. Spread powders made of cayenne pepper and black pepper, or flour, mustard, cayenne, and chili powder over beds. Consider using orange and lemon peels; some gardeners claim that they are effective deterrents. You can also plant chives, garlic, or onions.

Cochineal: Cochineal is a biting sucking insect that attacks pancake cactus, cholla and some agaves. The best form of eradication is a strong jet of water to dislodge the colonies and then spraying the cacti with insecticidal soaps. Cochineal can also be brushed off with scrub brushes and toothbrushes. The bug is common in urban areas because of the incidental increase in moisture and nutrients.

Cockroaches: True urban dwellers, cockroaches can be found almost anywhere. They are decomposers and do not damage a landscape. To deter them keep the areas around a structure clean and free of piles of debris. Caulk cracks and protect small openings into a structure with a screen. Boric acid is a good repellent, and there are maze-like traps that work without chemicals.

Cutworms: Cutworms are the larvae of moths. They live at soil level and dine on vegetation within their reach. One of the quickest remedies is to till and turn over infected beds. Spread cornmeal across the area and they might die from indigestion. Lay mulches of eggshells, wood ashes, chicken manure, and oak leaves around new plants. Cut back wild grasses in fall in areas where moths lay their eggs. Plant tansy.

Deer: To the avid gardener deer are a serious nuisance. Keep them out with fences and barriers (an 8' fence is needed if see-through; 6' if solid). Protect individual plants with chicken wire. Plant deer-resistant plants, which tend to have small, brittle and resinous leaves. Deterrents include soap bars and hair hung in branches, and mixtures of garlic, capsaicin, peppermint, and rotting eggs spread around and over threatened plants. Dogs are sometimes good deterrents.

Dogs: Deter a dog through its nose. Spread dried and crushed red peppers or cayenne powder around the areas they like to visit. Plant thorny ground covers, such as bougainvillea and natal plum. Spread coarse mulches. Plant chives, garlic, or onions.

Fleas: The common remedies to this warm-season irritant are well-known: regularly vacuum carpets and wash/comb pets. Other strategies include using eucalyptus mulch around doghouses, kennels and houses; lay nylon stockings filled with the eucalyptus leaves throughout a house. Also, place a bowl full of soapy water under a light to attract and drown fleas at night. Attract or purchase beneficial nematodes for the landscape.

Grasshoppers: Although a seasonal problem, grasshoppers are voracious eaters and can do a lot of damage while they are around. They lay their eggs on undisturbed, weedy soil. Planting aggressive ground covers, protecting bare soil with coarse woody mulch, and/or disturbing the soil in early spring will help to reduce populations. Diatomaceous earth is an irritant and can also deter them. A spray made from the tea of hot peppers and small onions can be used as a deterrent too. *Nosema locustae*, a fungal disease that affects a grasshopper's digestive system, is another good organic remedy. Plant horehound.

Gophers: These herbivores eat the roots of many plants, including some succulents. Traps are the most effective remedy. You can shove castor beans and elderberry branches in their holes and runs. Burying ½" hardware cloth under beds is also effective. Be prepared to be diligent; every control method requires repeated efforts.

Hives: Not all hives of flying insects are bad. Yellow jackets and paper wasps are considered beneficial insects because they eat houseflies and other pests. Prevention is the best method of control; screen all openings and cracks with wire mesh 1/8 inch or smaller. Dislodge new hives with a jet of water. Call a professional if the hive is large. Mint oil sprayed around the places where wasps and hornets congregate is a good repellent.

Mealy Bugs: Much like the cochineal beetle, with whom it is often confused, mealy bugs are biting, sucking insects. These cottony masses thrive in warm, humid environments. Dry the area and prune to improve air circulation. Use a strong jet of water to dislodge mealy bugs. Swipe a thin cloth dampened with rubbing alcohol to kill them. A mixture of dish soap and water is an effective deterrent, too, as is kerosene and water (both mixtures are 1 to 4 tablespoons per gallon of water). Also control the ants that help distribute them.

Mites: These tiny bugs are attracted to dusty environments and water-stressed plants. Make sure that the affected plant is not over or under watered. Use a strong jet of water to dislodge the insects and clean the foliage. Soap sprays and neem oil are effective controls. So is capsaicin and water (1 to 4 tablespoons per gallon of water). Mites are not true insects and insecticides do not work well against them; miticides are available if the problem is severe.

Moles: These diggers tend to do more damage in heavily watered landscapes. Let the soil dry. Traps are the surest remedy. Burying ½" hardware cloth under beds is also effective. You could try cramming a variety of items in the outlets and runs, including garlic, human hair, moth crystals, thorny stems, elderberry leaves and stems, castor oil or seeds, rotten eggs, and hot peppers. Visit the area daily and keep shoving the repellents back in their holes. Plant daffodils and castorbean.

Mosquitos: A California Friendly landscape would not provide the opportunity for mosquitos. Although only a tiny amount of water is needed to breed mosquitos, the water needs to be stagnant for at least 7 days; modern irrigation would rarely enable this type of water accumulation. But the reality is not everyone irrigates with conservation and mosquitos in mind. Citronella is good repellent. Rosemary and catnip can be rubbed directly on clothes, or made into a tea and sprayed on clothes and skin. If collecting water in an open system, then use *Bacillus thuringiensis israelensis* (Bt), available at any hardware store. Plant ageratum, basil, castorbean, catnip, marigold, or rosemary. For a more thorough discussion see the chapter on Rainwater Capture.

Pine Beetles: Pine beetles attack weak and water-stressed trees and are a serious problem in the Southern California foothills. Chemical controls are extreme and expensive. It is better to remove infested trees in winter (when the beetles are less active), prune damaged branches as you spot them, increase distance between trees, and deeply water trees in the long, dry summer months.

Rabbits: Rabbits are common in urban developments bordering natural areas. Dogs and cats can be deterrents. Laying coarse mulches, such as recently chipped trees, eggshells, and bramble, around new and vulnerable plantings helps. Mulches of pepper sauce, daffodil bulbs, iris rhizomes, catnip, and spearmint may work as well. Blood meal, bone meal and wood ashes are known deterrents. Mothballs can deter them, but should not be used around children. Plant anything in the onion family, such as chives, garlic, or onions. However, fencing is the surest way to protect particular plants or areas within a landscape from rabbits.

Scale: Scale are related to mites and, like these insects, thrive in dusty, humid environments. Make sure that the plant is not over or under watered. Use a strong jet of water to dislodge the insects and clean the foliage. Maintain healthy plants. Scale are protected by a shell; to remove scrape off or wipe off bugs with a cloth dipped in alcohol or turpentine. Horticultural oil and dormant sprays, such as neem oil, will suffocate them and are effective in spring and summer. Control the ants that help distribute them.

Skunks: Although feared by humans, skunks are good for a garden. They have a diverse appetite and eat fallen fruit, bugs, beetles and mice, all of which can be pests. If a nuisance, get rid of their homes by cleaning or removing woodpiles, cleaning drainage pipes, covering all openings into a structure, (such as crawl spaces) and rousting other small hiding spots. Make sure the lids of trash cans are on tight.

Snails and Slugs: Snails and slugs should not be a problem in a California Friendly landscape since they need consistent moisture to flourish. It stands to reason that the most effective remedy is letting the landscape dry. Build a trap by stacking moist wood and in the afternoon when they are hiding they can easily be picked out. Empty beer cans are a good trap too. The next best control is to physically remove them by hand at night. Eliminate high grasses, weeds, piles of debris and other places where they hide and breed. Copper strips provide a good barrier, especially around raised beds and containers, but may only be effective for a short period. Protect the base of plants with anything coarse, such as used sandpaper, berry brambles, oak leaves, diatomaceous earth, or wood ashes. A tea made from wormwood can also deter them. Sprinkling salt will desiccate them. Plant prostrate juniper, rosemary and wormwood to repel; chervil and sorrel to trap.

Spider Mites: Attracted to dry, dusty environments, this tiny biting mite creates a colony of webbing on the underside of leaves. Spider mites spread easily if plants are grown too close together. Remove or prune plants to create more open, breezy spaces. Make sure that the plant is not over or under watered. Use a strong jet of water to dislodge the insects and clean the foliage. The presence of this bug may indicate an oversupply nutrients; so do not fertilize again until there are signs of deficiencies. Apply dormant spray or horticultural oil in spring. Spray a mixture of ground limestone and dish soap. If organic methods do not work, then apply a miticide. Plant chives, garlic, and onions.

Thrips: Though widely distributed, thrips are a pest that prefers flowers and fruit. Mowing wild weeds helps enormously. The insects can be blown off with a jet of water or manually scraped off. A mixture of canola oil and water is a good repellent (1 to 2 teaspoons of canola mixed with 1 gallon of water); or use tobacco tea, oil, and water; or a paste of 1 part yeast, 1 part sugar mixed with water and smeared on flower buds. Plant Alyssum, clover, coriander, cosmos, dill, mustard and yarrow to attract green lacewings, a predator of thrips.

Whiteflies: These insects are common in humid environments with poor air circulation. Prune plants to open up the foliage and dry the area. Sticky tape will ensnare them and jets of water will dislodge them, both of which are the quickest controls. Insecticidal soaps are an effective control, as are teas and dusts made from tobacco. Ladybugs eat whiteflies. Plant marigold and tree tobacco as deterrents; nasturtium as a trap.

Disease and Fungal Pests

Black Spot: This is a disease that causes black spots and yellow margins on leaves. Proper irrigation is key: avoid watering the foliage; let the soil dry between watering; and never irrigate during periods of high humidity. Prune the plants to increase air circulation. Pull back mulch to increase soil temperature. Throw away the diseased plant parts. A spray of 6 tablespoons of vinegar to 1 gallon of water may work, but use cautiously as the vinegar can harm some plants (test first). Another good spray is 1 teaspoon of baking soda per 1 quart of water, plus a few drops of dish soap.

Blight: The term blight refers to a number of diseases, most of which prefer moist, humid, and hot environments. Cut back on watering and prune to allow sun to strike the soil. Not much can be done for infected plants except removing the infected parts. However, deterring the insects that spread the disease, such as aphids, can slow its spread. If caught early, try a spray of 2 tablespoons of bleach and 2 tablespoons of baby shampoo in 1 gallon of water.

Powdery Mildew: This fungus covers blossoms and leaves with a thin layer of chalky growth. It prefers shade. Pruning helps a lot; it increases sunlight, improves air circulation, and removes infected parts. Counter to many of the other fungi, powdery mildew does not like to be wet; wash blooms and leaves at first sign of the disease. Powdery mildew may indicate over fertilization so do not fertilize again unless the landscape shows signs of deficiency. Good fungal sprays are 1 tablespoon of baking soda and 1 to 2 teaspoons of canola oil mixed with 1 gallon of water, or 3 tablespoons of vinegar to 1 gallon of water.

Root Rot: Root rot is caused by any number of fungi that kill the plant at or below its base. Improve soil drainage by working amendments, such as mulch and compost, into the soil. Dramatically cut back on watering. Plant rot-resistant varieties.

Rust: This fungal disease appears as an orange spotted mass that typically inhabits the underside of leaves. It spreads by water and wind. Switching from overhead irrigation to low-flow can help a lot. Remove contaminated vegetation from property. Keep areas around plants clean of debris during the wet months. Prune to increase sunlight and air circulation. If none of these measures work, replant with more rust-resistant varieties.

Sooty Mold: This fungus creates a thin, sticky black and gray film that coats leaves. It is as ugly as it is damaging. Sooty mold thrives on the honeydew of bugs and is usually a sign of other pests. It can also be a sign of high humidity and poor air circulation. First, control the bugs that are secreting the honeydew, which are typically aphids, mealy bugs, scale and whiteflies. A firm jet of water will reduce all populations. Prune the area to increase sunlight and wind. Keep the area dry.

Companion Plants

A companion plant is one that improves the health of the plants growing around it. Companion plants can be used to attract pollinators, control pests, enrich soil, or improve the flavor of certain crops. For pest control there are three general categories of companion plants: plants that attract a pest's predator, plants that repel pests, and plants that trap pests. The use of companion plants will not solve pest problems alone, but they are an effective addition to the other strategies offered in this chapter.



Nasturtium has been planted between this row of fruit trees to help trap aphids. Marigold has been planted to discourage nematodes and whiteflies. Orange Homegrown Community Farm, Orange.

Plants that Attract

The purpose of these plants is to attract the insects that will eat the pests you want to eliminate. They do it by providing food and water or breeding and resting opportunities for them. Plants that attract beneficial insects include alyssum, angelica, aster, basil, black-eyed Susan, blanket flowers, buckwheat, coreopsis, coriander, cosmos, dill, fennel, feverfew, mustard, sage, tansy, tidy tips, and yarrow.

Plants that Repel

These are the plants that some pests actively dislike and try to avoid. They include angelica, basil, chive, clover, eucalyptus, garlic, leek, marigold, mint, mustard, onion, petunia, rosemary, southernwood and tobacco.

Plants that Trap

The goal of these plants is to attract unwanted pests, pulling them away from favored plants. Though they are sacrificial, they still need attention—the pests they attract will become a problem if not handled. Pruning or removing the infested vegetation and then replanting is necessary. Some of the plants that attract unwanted pests include basil, chervil, clover, datura, fennel, lamb's quarter, marigold, nasturtium, pelargonium, sorrel, sunflower and wild radish.

There are three strategies to help these plants have a bigger impact. First, ensure that something is in bloom most of the year; spring, summer and fall flowers are all needed. Second, pick at least three plants for each season, meaning that at a minimum a landscape will have 9 types of companion plants. Third, plant the same plant in groups of twos and threes: the greater the mass, the greater its effect.