

Organic Pest and Disease Control for Perennial Plants

Gardeners will inevitably encounter pests and diseases that damage plants and their yields. Though frustrating, it is important to remember that organisms we call “pests” and “diseases” are simply part of the natural world – they are doing what they need to do to survive. There are, however, many natural methods to prevent pest and disease infestation and to control their effects when they are present. Below are some general guidelines and tips for maintaining healthy pest- and disease-resistant gardens. The tables following list specific pests/diseases, their effects on plants, and known organic methods for their control.

Maintain fertile soil, rich in organic matter – Healthy soil gives rise to healthy plants. The more nutrients in the soil, the stronger and more pest and disease resistant they are. Organic matter in the soil keeps it well-drained and encourages the growth of beneficial soil organisms that compete with diseases.

Plant resistant varieties – Some plants have been bred to be more resistant to pests and diseases. When you purchase your plants, request the more resistant varieties, if available.

Plant diverse polycultures - A row of the same variety of plant is a banquet feast to a pest that feeds on the particular type of plant. But if you plant a mixture of species in the same area, you mix it up for the pest and it's harder for it to find its preferred foods.

Ensure good air circulation – Make sure that plants are spaced enough to allow air flow between them and prune when necessary to allow air and sun to reach fruits on trees or bushes.

Attract beneficial organisms - Birds, bats, toads, spiders, and beneficial insects feed on garden pests. If you attract them into your garden, they will work for you! (See *Beneficial Garden* project.)

Use row covers when appropriate - Row covers are sheets of lightweight translucent fabric that keep pests from touching the plants. This is used particularly when plants are young.

Use physical pest controls first – Many pests can be hand-picked or knocked off a plant and drowned in a container of soapy water. A strong spray of water from a hose can also knock pests off plants.

Use non-toxic spray solutions next – There are commercially produced organic sprays that target particular pests and do not appear to cause harm to beneficial organisms nor to other wildlife or humans. Some of the more common ones are:

- **Bt**, *bacillus thuringiensis*, a naturally occurring bacterium in soils that infects and kills certain insects.
- **Kaolin clay spray**, often marketed under the name “Surround,” forms a mineral-based protectant film that dissuades pests from being near the plant.

- **Beneficial nematodes** are microscopic worm-like organisms that live in the soil. They prey parasitically on pest larvae in the soil.

Use low-toxic organic controls as a last resort - Though organic, these pesticides are not targeted to a particular pest and they may also kill beneficial organisms. Some of the common ones are the following:

- * **Diatomaceous earth** is a powder with sharp-edged particles that cut into soft-bodied organisms, such as slugs.
- * **Insecticidal soaps** is a mix of liquid soap, hot peppers, and garlic (or other strong-scented spices) that is sprayed on plants. These soaps can be made at home, but it is important to follow a tested recipe (available on the Internet).
- * **Neem oil**, oil pressed from the fruits and seeds of an evergreen tree, is used as both an insecticide and a fungicide.
- * **Baking soda spray** is a homemade mixture of baking soda, water, and a little bit of dish soap that can be effective in controlling fungal and bacterial diseases in plants.

Use good garden sanitation practices – Wash your hands and your tools after working with diseased plants. Sterilize pruning tools with alcohol after working with a plant to avoid spreading disease to from one plant to another. Remove diseased or infested plant material and destroy it by burning or burying it far from your garden.

Table 1 - Pest Control

The following table lists some of the most prevalent pests affecting perennial plants and some well-known methods for keeping them in check.

Pest/Description	Affected Plants	Signs and Symptoms	Prevention	Organic Controls
Aphids tiny, pear-shaped insects, pale green, brown, yellow, pink, blue or black	many leafy perennials; berry bushes	sticky grayish masses on leaves, tender shoots, stems and flowers; leaves curl and turn yellow	plant onions and garlic to repel; plant sweet alyssum, clover, or plants from the aster and parsley families to attract aphid-eating beneficials; avoid heavy nitrogen application	attract aphid-eating beneficials such as ladybugs, lacewings, and parasitic wasps; apply garlic spray, neem oil, or kaolin spray; eliminate affected plants and use row covers to stop spread
Caterpillars (tomato hornworms, cabbage moths, etc.)	many leafy perennials	large holes in leaves; rapid devouring of plant	plan garden to attract insect-eating birds, parasitic wasps, lacewings, and ladybugs	hand pick off; Bt spray, neem oil, or kaolin spray
Cutworm brown or gray caterpillar with shiny heads often found just below the soil surface	many leafy perennials	stems of young plants are chewed through at the base	make collars from cardboard tubes and place around stem of young plant, bury collar 1 inch below soil	hand pick off plants (at night); unbury them from ground in the morning; attract birds to eat, squash by hand, or drown in soapy water
Flea beetle tiny, shiny black insect some have yellow white stripes on back	watercress, plants in the brassica family	tiny holes in leaves; defoliation	interplant crops; plant densely and mulch heavily to create a dark, moist environment disliked by flea beetles	row covers; diatomaceous earth; pepper-garlic spray; neem oil; kaolin spray
Japanese beetle very shiny insect with blue-green	many perennials	adults consume all but skeleton of leaves;	plant four o'clock flowers as	hand pick off plants, drown in soapy water; pheromone

bodies and bronze wings		larvae feed on plant roots	trap plants; check trap plants daily	traps; beneficial nematodes; neem oil, kaolin spray
Leaf hoppers slender, wedge-shaped insects; green, brown or yellow with colorful markings (there are many different species)	many fruit crops, including strawberries, raspberries, and apples, plums and grapes	burn-like or white spotting on edge of leaves; stunted plant growth	row covers in the spring; plant to attract beneficial insects such as ladybugs, lacewings, and minute pirate bugs	apply diatomaceous earth; apply insecticidal soap spray
Plant-Parasitic Nematodes tiny worm-like organisms, live in soil	many perennials, particularly in warm climates and sandy soils	stunted or distorted growth, yellowing, galls or knotty growths on roots; can spread viruses between plants	encourage nematode-eating fungi and bacteria by keeping soil high in organic matter; plant nematocidal crops such as castor bean, sesame, canola, and marigolds	remove affected plant and soil around it; sterilize soil by covering area with clear plastic and let it sit in the sun for 6 to 8 weeks
Slugs soft-bodied gray or tan crawling mollusks; leave a trail of slime as they move	many perennials, especially low-growing greens in damp or shaded areas	ragged holes in leaves, often near plant base	encourage slug predators: ground beetles, birds, snakes, toads and lizards	sprinkle wood ashes, diatomaceous earth, or ground egg shells around plants; sink small dishes of beer into soil to attract and drown slugs; hand-pick them off the plants
Tarnished plant bug oval, fast-moving insect with a mottled brown, yellow and black pattern on the body, triangle design on wings	many perennials	distorted leaves; buds drop off plants; branch tips blacken or die back	plant groundcovers to attract natural predators: minute pirate bugs, big-eyed bugs, and damsel bugs	use row covers; apply insecticidal soap, or kaolin spray
Thrips tiny black or straw-colored insects, generally not visible to the naked eye	many perennials	dried, scarred silvery leaves and flowers	mulch heavily in early spring to prevent adults from emerging from	apply diatomaceous earth; apply garlic spray, insecticidal soap, or neem oil

			soil; keep environment moist (thrips thrive in environs)	
Whiteflies tiny moth-like insects with powdery white wings and short antennae	many perennials	yellowing of plant, sticky "honeydew" with black mold	plant to attract ladybugs and lacewings	apply insecticidal soap, garlic, or pepper spray

Table 2 – Disease Control

The following table lists some of the most prevalent diseases affecting perennial plants and some methods for preventing or reducing damage.

Disease	Affected Plants	Signs and Symptoms	Prevention	Organic Controls
Anthracnose fungus (<i>Colletotrichum</i> , <i>Gloeosporium</i> , <i>Glomerella</i> , <i>Marssonina</i> , <i>Sphaceloma</i>)	many perennials including roses and fruit trees	circular sunken spots or lesions on foliage, pink spore mass	good air flow, garden sanitation	apply baking soda spray, neem oil, or copper fungicides; remove affected plants; prune affected areas of trees and burn prunings
Botrytis fungus (<i>Botrytis spp.</i>)	many perennials including strawberry, grape, other berries, roses	velvety gray fungus growth; strawberries soften, turn pale, and rot on the vine	good air circulation, garden sanitation, good drainage	remove affected growth; apply baking soda spray
Black knot fungus (<i>apiosporina morbosa</i>)	plum trees, cherry trees	knotty black bulges	good air circulation, garden sanitation	prune affected areas in winter; apply lime-sulfur spray
Brown rot (<i>monilinia fructicola</i>)	Stone fruit trees including plum, cherry, apricot, peaches, almond	kills blossoms; twigs have small cankers with gum extruding; fruit has buff-colored	good air circulation; garden sanitation	Remove infected "mummified" fruit; prune diseased wood and burn

		powdery spores on soft brown rot		
Fire Blight bacteria (<i>erwinia amylovora</i>)	apple, pear trees, rosebushes	flowers turn brown and wilt; twigs shrivel and blacken, with ends curling; amber-reddish ooze	good air circulation; garden sanitation	prune infected branches and stems; burn diseased wood
Root rot fungi (<i>Aphanomyces</i> , <i>Fusarium</i> , <i>Pellicularia</i> , <i>Phoma</i> , <i>Phytophthora</i> , <i>Pythium</i> , <i>Rhizoctonia</i>)	many perennial crops including asparagus, avocado, and citrus trees	wilting, yellowing of plant, rotting roots; trees die from top down	good air circulation, good drainage	remove and destroy affected plants
Powdery Mildew fungi (<i>Erysiphe</i> , <i>Sphaerotheca</i>)	grape, strawberry, wolfberry, apple, pawpaw	circular white powdery spots on leaves and stem	good circulation, garden sanitation	apply baking soda spray; remove and destroy affected plant parts; for apples, prune infected shoots in winter
Viruses (many kinds)	watercress, nightshade family, roses	yellowing, distorted or stunted growth	control aphids, and other insects that spread viruses; select resistant varieties	remove and destroy affected plants - no cure