The first rule of thumb in organic gardening is to **KNOW YOUR ENEMY**. Correctly identify your problem before panicking and running down to your local garden center or hardware store for the strongest poison you can find. By understanding the life cycle and characteristics of your pest or disease, you can choose the safest and least toxic control for you and the ecosystem that exists in your backyard. The second rule of thumb is **SCOUT FOR PESTS ON A REGULAR BASIS**. Stopping an infestation at the earliest stage is the easiest way to deal with a problem. Here are a few common garden problems and some safe solutions to control them:

### BLACK SPOT AND POWDERY MILDEW
Black spot is most common on roses; powdery mildew can attack phlox, bee balm, zinnias and many other garden flowers. The first approach is to spray weekly with 1 tbsp. baking soda and 2½ tbsp. low viscosity horticultural oil (one brand is Espoma Earth Tone Horticultural Oil which is a canola oil) in 1 gallon of water. *Be sure to follow package directions to water the plants in the morning and spray them in the evening.* High quality **Neem oil** also is highly effective in preventing fungus attacks while killing insects on contact. A third option is to use **BioSafe Disease Control** a Hydrogen Peroxide based product that can be used as a treatment or preventative against disease, this product is great as it will become benign in the soil and actually help to feed beneficial microbial life. The second approach is to spray immediately upon the first sight of fungus, or just before its onset with **Actinovate**, Streptomyces lydicus, which is a beneficial and naturally occurring bacterium commonly found in the soil. Its sister product **Actino-Iron** works similarly, but is enriched with iron and humic acid.

### RUST AND BOTRYTIS
are very common fungal diseases. Rust infects hollyhocks and many asters. It shows up as orange pustules on the back side of the leaves. Botrytis causes the blackening of the buds and leaves on Peonies. Both can be controlled by spraying **liquid copper** (copper sulfate) in the spring as soon as shoots emerge and again as the leaves unfold. Powdered copper can be dusted on the foliage in severe cases. Actinovate also works very well. Repeat throughout the summer, being careful not to spray if the temperature is above 86 degrees. **GARDEN SANITATION is critical.** Remove any blackened peony buds or leaves and discard them, do NOT compost them. Dip your sheers in bleach or alcohol to disinfect them before moving on to other plants. Remove rust-infected foliage from hollyhocks and discard. Clean up all debris from the base of the plants in the fall, after the winter, and all summer long. For severe problems, remove and discard the mulch, and clean cultivate beneath the plants.
APHIDS AND BEETLES and other “bad” bugs Garden insects come in all shapes and sizes. Learn what you are dealing with and their life cycle before you spray. For mild aphid infestations, simply hose off the new growth with a strong stream of water. Also make sure you are not feeding your plants with too much nitrogen, which encourages the lush, tender growth that aphids especially like. Most insects can be controlled with a solution of Pyrethrum (a spray made from a South American daisy), diluted according to the label directions. To make it more effective, add 1 Tbsp. to ¼ to ½ cup of rubbing alcohol to each gallon of pre-mixed spray (test this on a small section of the plant first, then wait 24 hours to be sure that the strongest dilution does not burn). The alcohol helps the pyrethrum to penetrate the insect’s body faster. Other excellent products that work very well are Neem (active ingredient name azadirachtin) which is derived from the seed of a tropical tree. A plant oil based product such as Dr. Earth Vegetable Garden Insect Killer is also effective. Other products include Hot Pepper Wax (active ingredient is capsicum) and Diatomaceous Earth. Hot pepper and garlic do not kill insects, they repel them. Diatomaceous Earth on the other hand will cut into an insect’s exoskeleton and get lodged in its joints, drying it out.

CATERPILLARS Most caterpillars are easily controlled, if discovered at a young age, with Bacillus thuringensis (BT), a biological insecticide. This is a parasitic bacteria that is host-specific to the insects and is completely harmless to humans and the environment. Always remember that not every caterpillar is a “bad bug”. All butterflies must be caterpillars at one stage of their lives. Learn to develop a degree of tolerance for small populations of insects and try to discover exactly what they are… you could be wiping out entire populations of Monarchs or Tiger Swallowtails in your desire for a totally pest free garden!

SAWFLIES look very much like caterpillars but are actually a group of insects related to wasps and bees. Adult sawflies are inconspicuous wasp-like insects that do not sting. The larval or immature stage of sawflies are plant feeders and look like hairless caterpillars (the immature stage of butterflies and moths). Sawflies often feed in groups and can quickly defoliate portions of their host plant. There are many different species of sawflies and each prefers specific plants or groups of related plants. Common sawflies on garden flowers include the Rose Sawfly (also called the Rose Slug) which feeds from mid-May through June, the Hibiscus Sawfly, the European Pine Sawfly (which infects Mugho pines April / May / June) and the Dogwood sawfly (which defoliates Lysmachias and our native red twinged dogwoods). *Bacillus thuringiensis will NOT work on sawflies! Instead, use Neem, Spinosad, or Pyrethrum mixed with alcohol* as described above under “bad bugs”.
**SLUGS** You'll be thrilled to know that slugs reproduce rapidly, laying hundreds of eggs a year. The eggs hatch in three weeks and baby slugs will start laying eggs when they're only a few months old. The most effective slug control on the market is iron phosphate, sold by the brand name **Sluggo**. This is a very safe bait that contains the active ingredient iron phosphate, which occurs naturally in the soil. Sprinkle it around plants that are being eaten. An effective early control to prevent the first generation of slugs from breeding in the spring is to sprinkle Sluggo in a band and cover it with a long board. In the morning, lift the board, discard the slugs, and repeat this process again the following evening. Do this until you don’t see slugs any more. Vigilance in the spring means fewer generations of slugs will survive to breed all summer long!

**Sluggo Plus** contains spinosad and kills earwigs too.

**MOLES AND VOLES** are different creatures. Moles eat grubs and other insects; voles can travel through mole tunnels but they eat plant roots and are vegetarians. Both can be killed by bombing the holes with **sulfur bombs**. There are also metal traps available to put in their runs if bombing isn’t your cup of tea. Castor oil repels moles and voles, and a product called **Repellex Mole and Gopher Repellant Hose End** which is sold as a hose-end sprayer, contains castor oil and paprika. You can drench the infested area or put the hose down the obvious holes (runs) and flood the area. This is best done weekly until the problem subsides. Castor oil is also available in a granular form that is broadcast on the affected area. The granular **Repellex Mole and Gopher Repellant** also contain wintergreen, paprika, and garlic in a sodium lauryl sulfate solution. Clean, dustless, biodegradable granules are safe for use around children, plants and pets. 1 lb. treats 500 sq. ft. and lasts up to 3 months. Contains 10% Ricinus communis oil (Castor Oil). Pour it down the mole or vole tunnels; broadcast it just before a prolonged rainy period so that it will be dissolved into the soil or water well after applying with your spreader. **Repellex Systemic Granular**, a capsaicin based product, will provide up to 6 months of protection when applied and watered in around the base of a plant. As the Systemic is actually brought up into the plant, it will not wash off and will make the plant unpalatable but won’t harm pollinators. Not for use on food crops.

**IRIS BORER** The life cycle of the iris borer is as follows: Caterpillars emerge from the soil in April or May when the leaves are 5-6" high. They climb the foliage, pierce the leaves and enter the leaves. They tunnel down (leaving linear tracks) and enter the rhizomes, growing to be fat, flesh colored worms 1½-2" long. They eat out the center of the rhizomes then migrate into the soil, where they pupate. In late summer and fall they turn into night-flying moths that are purplish yellow in color. The moths lay eggs on the iris foliage and debris at the base of the leaves. Eggs are a creamy green, later turning lavender. The most important control measure is GARDEN SANITATION! Cut and eliminate all stalks and foliage each fall, as they are the primary over wintering site. Do this late into the fall, shaving the foliage as close to the rhizomes as possible. In early spring, if you see borer tunnels starting in the leaves, pinch them to kill the larvae.

**SCALE** is a hard-shelled insect that can cover the stems of the plant and suck the life out of it. It is very common on Euonymus. The best control is to spray the plants in winter with dormant oil. Low viscosity oil, such as Earth Tone Horticultural Oil, can be used during the growing season in a 2-3 percent solution. Another summer control is to mix 1 cup alcohol with ½ teaspoon insecticidal soap in 1 quart water and spray on every 3 days for 2 weeks.
BLACK VINE WEEVILS are night feeders making jagged chew marks on the edges of the foliage. Since you cannot see them during the day, it is very frustrating to diagnose your problem!

An excellent website to read about black vine weevils is:
http://extension.umass.edu/landscape/fact-sheets/black-vine-weevil

Adult weevils emerge in June and feed through July. At the end of May, use 2x3’ burlap square folded into 4” pleats and placed snugly around the base of the plant. When adults crawl to the base of the plant before daylight, they will settle in the pleats of the burlap. Collect and discard them. In mid-June, inspect traps weekly and collect adult weevils. Continue trapping until the traps cease to produce any new weevils for at least two weeks.

For a small infestation, spread a drop cloth under your shrub (at night) and “beat” the branches. They will drop into the cloth and can be destroyed. When weevil damage appears, you can also spray weekly (at night) with a solution of 1 tbsp. alcohol in 1 pint of mixed pyrethrum solution. Beneficial nematodes also control the larvae of black vine weevils.

GRUBS The larval stage of the Japanese and other beetles are called grubs. They not only attack the roots of lawn grasses, but they also turn into plant and flower chomping adult beetles! There are two methods of controlling them. Milky Spore disease is now available encapsulated in a granular form that is easily applied with a fertilizer spreader. This gives the grubs a disease, which kills them. It takes two years to make a significant difference in your lawn or yard; once Milky Spore disease is present, it can last up to 10 years. Beneficial Nematodes are the second natural control measure. These are microscopic organisms that invade and kill grubs within 24-48 hours. They are mixed with water and sprayed on the soil in summertime until mid-October and will provide control for 6 weeks. Because they are living organisms, you must follow directions exactly regarding refrigeration and application.

Sources of information on organic and ecological pest control:
1. Natureworks website  www.naturework.com  located under Garden Info. - Handouts
3. Organic Land Care Standards, published by the Organic Land Care Committee of CT and MA. Website: organiclandcare.net

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