

ORGANIC STRATEGIES FOR THE GARDEN AND HOME LANDSCAPE

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What is Organic Gardening? Generally accepted organic practices comprise soil management, fertilization, and pest management.

The USDA National Organic Program established rules for commercial organic production. These rules do not apply to home gardeners, but they are a useful guide to choosing organic pest management alternatives. The chemicals listed in this section are recognized as organic insecticide, fungicide and bactericide alternatives by the National Organic Program.

Organic pest management is not simply replacing a conventional pesticide with another chemical that is labeled 'organic'. Knowledge and planning are the keys to successful organic gardening. Consider a Master Gardener Class offered through your local Extension Service. Additionally, your local library offers books on organic gardening.

Principles for Organic Gardening

Healthy plants are less susceptible to pests and disease. Stressed plants attract some pests.

Choose plants that are adapted for your local climate.

When you buy plants, inspect them carefully for signs of pest infestation.

Test the soil to make sure the plants are receiving the nutrients they need to stay healthy.

Plant at the right date and under the proper light/water conditions.

Consult your local Cooperative Extension agent for advice about choosing plants and creating healthy growing conditions.

Anticipate problems.

Find out what pests and pathogens are common in your area.

Look for plant varieties resistant to regular pests and pathogens.

Learn the life cycles of the pests and pathogens you expect.

When/how do they arrive?

Are any stages of the life cycle vulnerable (or protected)?

Cooperative Extension is your best source.

Scout for pest and disease problems regularly.

It is much easier to manage young insects, early infections, and small populations.

Scout at least three times per week in warm weather.

Look at the whole plant, under leaves, and along stems.

Practice good sanitation.

Dispose of diseased or spent plant materials promptly.

Many pests and pathogens will persist over the winter in crop debris.

Use crop rotation.

Do not plant the same type of plants in the same place each year.

Encourage natural controls.

An assortment of flowers and herbs will attract beneficial insects.

Use mechanical controls.

Row covers and hand-picking are practical on a small scale.

Water spray is effective against many insects if the plants are hardy enough to withstand a vigorous spray.

Utilize cultural controls.

An appropriate planting date may avoid peak pest populations.

Mulch helps keep plants healthy and controls some pests and pathogens.

Avoid plants or particular varieties that have a lot of pest problems.

Use chemical controls sparingly. An “organic” listing does not eliminate all risks.
 Spot treat instead of spraying a large area.
 Use pesticides only when other options are not practical.

ORGANIC INSECTICIDE/MITICIDE OPTIONS

Except for spinosad products, nearly all organic insecticides have little or no residual activity. Repeated applications may be necessary before you see results.

Nearly all organic pesticides have a very broad range of use sites, which means you can use them nearly anywhere in the garden or landscape. Check the label to be sure it is labeled for the site you need to treat.

USE ALL PESTICIDES ACCORDING TO THE LABEL INSTRUCTIONS! If used improperly, even natural products may injure your family or pets.

To use this guide, locate your pest problem and identify the chemical options. Review the chemical options for additional information and potential risks. If you need help choosing among several options, consult your local Extension agent.

Caterpillars	– pyrethrins, <i>Bacillus thuringiensis</i> kerstaki, spinosad, neem
Fire ants	spinosad (fire ant bait formulation)
Thrips	spinosad
Aphids, whiteflies, other soft bodied pests	pyrethrins, oils, insecticidal soap, neem
Stink bugs	neem, pyrethrins, spinosad
Beetles	spinosad, pyrethrins, neem
Scale insects	oils
Mites	oils, sulfur, insecticidal soap
Mosquito larvae	<i>Bacillus thuringiensis</i> israelensis
Yellow jackets	traps, pyrethrins
Slugs/snails	iron phosphate

Pyrethrins (pyrethrum) are produced by some varieties of chrysanthemum. Pyrethrins are often combined with piperonyl butoxide (PBO), which significantly increases the effectiveness of pyrethrins. The PBO is a synthetic chemical; some people do not consider PBO combinations an organic alternative.

Pyrethrins are also available in product combinations with oil or sulfur to give the products greater activity against mites and diseases.

Risks: May kill bees and other beneficials. Extremely toxic to aquatic species. Pyrethrins can be toxic to cats.

NOTE: Very short (hours) residual activity. Insects may recover from pyrethrin exposure unless PBO is added to the product.

Pyrethrin products – Garden Safe, Ortho Ecosense, Bonide, others.

Horticultural oils and dormant oils are highly refined petroleum products. Oils must be applied to the insects/mites to kill them. No residual activity.

Risks: May kill nontarget arthropods if they are covered with oil. May cause plant injury, particularly if the weather is hot or the plant is water stressed.

NOTE: Be sure you are using the right oil and the right concentrations to minimize the risk of plant injury.
 Petroleum oil products – Bonide All Seasons and many others

Other oils include sesame oil, soybean oil, and canola oil. We have limited information about their efficacy, but their activity will be similar to the petroleum oils. They can also cause phytotoxicity.

Neem (azadirachtin) is derived from the Neem tree. Leaf extracts and oils pressed from nuts are available. Neem is an insecticide, an insect growth regulator, and a repellent. An insect growth regulator prevents juvenile insects from maturing properly.

Risks: High concentrations can harm fish. Low risk to bees and other beneficial insects.

Neem products: Green Light, others

Spinosad comes in two forms. The organic form is derived from a soil bacterium, *Saccharopolyspora spinosa*. The other form is a synthesized version of the same chemical; it is not considered to be organic.

Risks: May harm bees. Low risks for other nontarget species.

Spinosad products: Fertilome, Bulls Eye

Iron phosphate is the only organic slug bait in U.S. Used for many years in Europe.

Risks: Low risks to nontarget species.

Iron Phosphate products: Ortho Ecosense, Worryfree

Insecticidal soap may also be called Potassium Salts of Fatty Acids. They must be applied directly to the insects. They have no residual activity.

Risks: May cause plant injury, particularly when weather is hot or plant is water stressed.

Insecticidal Soap products: Ortho Ecosense, Safer, others.

Sulfur is commonly found in combination with other organic products to provide control of fungal diseases.

Risks: Low risks to nontargets. May cause irritation of skin, eyes, and throat tissue.

Sulfur products: many.

Bacillus thuringiensis kerstaki is a strain of *Bacillus* bacteria that only infects caterpillars. The caterpillars must consume the bacteria. Birds, fish, pets, people, etc. catch this strain of bacteria.

Risks: Very low risks to nontarget species (except other caterpillars).

Bacillus thuringiensis kerstaki products: Dipel, Thuricide, others.

Bacillus thuringiensis israelensis is a similar strain of bacteria that controls mosquito larvae. Use it water containers or ponds where mosquitoes are a problem.

Bacillus popillae is a bacterial strain that infects Japanese beetle larvae. It will not affect adult insects. There is no clear evidence that using *Bacillus popillae* will reduce Japanese beetle damage in your yard.

Japanese beetle traps catch large numbers of Japanese beetle adults attracted from a large area. There is no clear evidence that using Japanese beetle traps will reduce Japanese beetle damage in your yard. On a large property, it may be possible to attract Japanese beetles away from desirable plants; however this strategy is unproven.

Yellow jacket traps can help to reduce the number of yellow jackets in a local area. May seem ineffective if other foods are

nearby that are also attractive to yellow jackets.

Diatomaceous earth is not recommended. It loses most of its effectiveness in damp/humid conditions, and it is difficult to avoid inhaling the dust.

Home brews are commonly used and widely touted on the internet. Common brews include garlic, hot pepper, ground insects, etc. Because there is no consistency among brews, there are no reliable data to gauge their effectiveness. Garlic and hot pepper are known to repel some insects.

<http://www.omri.org/> Organic Materials Review Institute and the National Organic Standard. Includes a list of all of the pest management chemicals accepted as organic.

<http://attra.ncat.org/organic.html> National Sustainable Ag Information Service. This site has a great deal of information about organic production, including pest management.

<http://www.ams.usda.gov/AMSV1.0/NOP> - USDA National Organic Program.

ORGANIC FUNGICIDE/BACTERIACIDE OPTIONS

The products listed in this section are registered by the EPA and are “approved” for use in organic production. However, most of these products are non-specific and are toxic to humans, plants, and many non-target invertebrates and aquatic life. In addition, the effectiveness of most of these products is generally limited when compared to “conventional” pesticides. With this in mind, organic pesticides should not be considered as substitutes for or used as conventional fungicides in a pest control program, and should only be used judiciously and as a last resort in an integrated pest management program. Most plant diseases in the home garden do not cause sufficient harm to the plant to justify the use of pesticides.

Type of diseases controlled	Compound	Notes
	Coppers:	
Many fungal and bacterial diseases, including powdery and downy mildew, fungal leaf spots, anthracnose, bacterial leaf spot and/or blight, fire blight and rust on a wide variety of fruits, vegetables and ornamentals. Effectiveness against most pathogens is often limited. Labeled for many plants.	Copper sulfate and fixed coppers (copper hydroxide, copper oxide, copper oxychloride)	Copper is toxic to fish, aquatic invertebrates, and humans. Label directions and harvest intervals should be followed carefully. Copper is a heavy metal and must be used in a manner that minimizes accumulation in the soil Coppers have the potential to burn the foliage and flowers of many plants. To avoid this problem, do not spray prior to or during the flowering period, or during prolonged cold, wet weather. Refer to individual product label for plants which may be treated.
Various diseases of fruits, vegetables and ornamentals including leaf curl on peaches and bitter rot, black rot and scab on apples. Labeled for many plants.	Bordeaux Mixture (hydrated lime/copper sulfate)	Lime added to copper sulfate increases the effectiveness of the copper. Phytotoxicity (burning of foliage and flowers) can occur on many plants including the young, tender leaves of peach, plum, rose and apple. Some sensitive plants require diluting the product to one half strength (depending on the product used – see label) to avoid phytotoxicity. Should not be used during cool, wet weather since this can increase damage to plant foliage.
	Sulfurs:	
Used in the dormant season to kill overwintering fungal spores of black spot, powdery mildew and rust of rose, leaf curl and shot-hole of peach, cane blight and leaf spot of brambles. Some brands labeled for delayed dormant and/or growing season applications for scab and powdery mildew of apple, anthracnose, rust and powdery mildew of blackberry and powdery mildew and scab on pear.	Liquid lime-sulfur (calcium polysulfides)	Labeled for roses, peaches, pears, brambles, fruit trees, deciduous hedge plants, delphinium, lilacs, euonymous, columbine, crepe myrtle, sweet peas, zinnias, fruits, ornamentals, and tuberous begonias. Do not spray when temperature is expected to exceed 80°F within 24 hours. Spray early in the morning or late in the evening to avoid burning of foliage. Also controls mites and scale.

ORGANIC STRATEGIES FOR THE GARDEN AND HOME LANDSCAPE (continued)

Type of diseases controlled	Compound	Notes
Sulfurs: (cont.)		
<p>Controls fungal diseases including powdery mildew, scab, and cedar apple rust of apples, brown rot and scab of peach, plum and nectarine, powdery mildew on brambles and strawberry. Also labeled for powdery mildew, leaf spots, rust and botrytis on many vegetables and ornamentals (includes black spot of rose).</p>	<p>Elemental sulfur (Dry wettable sulfurs of flowable sulfurs)</p>	<p>Should not be used when the temperature is above 90 degrees or within four weeks of an oil spray as injury to the foliage may occur. Refer to individual product label for plants which may be treated. Do not use on apricots, cucumbers, d'Anjou pears, melons, spinach, squash or viburnum as sulfur causes injury and defoliation to these plants.</p> <p>Sulfur is lethal to beneficial insects, spiders and mites leading to increased problems with certain pests including mites. Residue may be a problem.</p>
Other compounds:		
<p>Some control of insect vectors of viruses and a few fungal diseases such as powdery mildews and black spot.</p>	<p>Oils, horticultural, narrow range oils as dormant, suffocating, and summer oils</p>	<p>Do not apply when sulfur compounds have or will be used. This combination is toxic to the plant. Repeated use can cause build-up in the soil.</p>
<p>Controls various foliar fungal diseases, in particular powdery mildew on various hosts.</p>	<p>Potassium bicarbonate</p>	<p>Diluted in water and often mixed with insecticidal soap (surfactant) and horticultural oil to increase effectiveness.</p>
<p>Fire blight control in apples and pears only</p>	<p>Streptomycin</p>	<p>Bactericide/antibiotic compound. Has no fungicidal activity. Fire blight bacteria can develop resistance with prolonged use.</p> <p>When used for fire blight control of apples and pears it must be applied during bloom prior to the appearance of symptoms to be effective. Sprays should begin at 20-30% bloom and continue every 3-4 days until petal fall.</p> <p>Do not apply when fruit is visible.</p> <p>Do not apply within 30 days of harvest for pears.</p> <p>Do not apply within 50 days of harvest for apples.</p>