

ORGANIC STRATEGIES FOR THE GARDEN AND HOME LANDSCAPE

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What is Organic Gardening? Generally accepted organic practices that optimize soil health, fertility, and growing conditions.

The USDA National Organic Program has established rules for commercial organic production. These rules do not apply to home gardeners, but they are a useful guide for 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 office. Additionally, your local library offers books on organic gardening. Many websites offer information about organic gardening. The best sources of information are university sites (i.e., UGA, Florida, California, etc.) and established organic research institutes. Beware of home remedies; often there is no research to support these claims. Disease and pest occurrence and severity can vary in different regions, and books and websites from other parts of the country may offer remedies that are not appropriate for the Southeast United States.

PRINCIPLES FOR ORGANIC GARDENING

Organic practices are not much different from good gardening practices. There are many good organic guides and educational opportunities available. The most important factor for growing healthy plants of any type is to start with good soil on a sunny, well drained site. Before planting, incorporate a couple inches of good quality composted organic matter into the soil throughout the planting area. The target range for organic matter content in the topsoil is usually between 3 to 5%. Optimize soil pH, mineral and nutrient levels for the type of plants you are growing using biologically-derived or mineral fertilizers.

Healthy plants are less susceptible to pests and diseases. Stressed plants may attract pests. Choose plants that are adapted to our Southeastern climate, and grow them when they will be least affected by pest and disease problems. Our summers can lead to numerous pest and disease problems on plants not well adapted to our climate such as summer squash, cucumbers and tomatoes. Early

planting of these summer crops (late April into May) can avoid many of the problems that occur during July and August. Take advantage of our extended cool season by growing crops such as crucifers, onions, beets, potatoes, and spinach during the cooler months in fall and early spring.

If available, use plant varieties with resistance to common pests and diseases. When buying plants, inspect carefully for signs of pests and disease. For perennials, choose the right plant for the site conditions and spend time preparing the planting site. Use seed and plants grown using organic practices whenever possible.

Use crop rotation. Do not plant the same type of plants in the same place each year, especially plants that are prone to disease problems.

Mulching (covering the soil with leaves, straw, etc.) helps conserve moisture, keeps the soil cooler and results in healthier plants.

Avoid sprinkler irrigation and maximize air circulation around plants to lessen the impacts of disease. Water deeply but only as needed based on soil moisture.

INSECT AND DISEASE PROBLEMS

- Scout for pest and disease problems regularly.
- It is much easier to manage small populations and early disease.
- Look at the whole plant, under leaves, and along stems.
- Encourage natural controls. An assortment of flowers and herbs will attract beneficial insects.
- Row covers and hand-picking are practical on a small scale.
- Water spray is effective against many insects if the plants can withstand a vigorous spray.
- Use chemical controls sparingly. An “organic” listing does not eliminate all risks, especially to pollinators and other beneficial insects.
- Spot-treat instead of spraying a large area.
- Use pesticides only when other options are not practical. Tolerate some damage. Pesticides are usually not necessary in the home garden.
- Organic fungicide options have limited effectiveness.

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- Practice good sanitation after plants are done. Many pests and diseases will persist in crop debris.
- Dispose of diseased or spent plant materials promptly.

ORGANIC-APPROVED 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. Note: spinosad products come in both “organic” products and conventional products.

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.

To use this guide, identify your pest problem and consider whether chemicals are really needed. Review the chemical options for additional information and potential risks. If you need help choosing among several options, consult your local Cooperative Extension agent.

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

PYRETHRINS (*pyrethrum*) are extracted from some varieties of chrysanthemum. Pyrethrum is effective against a wide range of insects.

Risks: May kill bees and other beneficials. Extremely toxic to aquatic species. Spot spray on pests.

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

NOTE: Very short (hours) residual activity. Use as a contact spray directly on insects.

Pyrethrum products: Monterey, PyGanic, Bonide, others.

HORTICULTURAL OILS AND DORMANT OILS are highly refined petroleum products or oils derived from plants. Petroleum oils are not on the list of approved organic products, but they do not have the human/environmental risks associated with most conventional insecticides.

Risks: May kill non-target arthropods if they are covered with oil.

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 are listed as organic including sesame oil, soybean oil, orange oils, cedar oils, canola oil, and other plant-based oils. We have limited information about their efficacy, but their activity is likely to be similar to petroleum oils. They may also cause phytotoxicity.

Oil products: There are dozens of products. Look at the list of active ingredients.

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. Relatively low risk to bees and other beneficial insects. Neem products: Green Light, others.

SPINOSAD is derived from a soil bacterium, *Saccharopolyspora spinosa*. Spinosad is effective on a wide variety of insects including caterpillars. Because spinosad is very effective against some pests, people tend to use it every time. Using the same product repeatedly increases the risk that the pest will develop resistance. Rotate and/or combine any pest control with other options to reduce the risk of resistance.

Risks: Quite toxic to bees until dry. Low risks for other non-target species.

Spinosad products: Entrust, Monterey Garden Insect Spray

IRON PHOSPHATE is the only organic slug bait in the U.S. Used for many years in Europe.

Risks: Low risks to non-target 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 provides control of some fungal diseases and certain insects such as russet mites on tomatoes and other crops.

Risks: Low risks to non-targets. May cause irritation of human skin, eyes, and throat tissue.

Sulfur products: Many products are widely available.

BACILLUS THURINGIENSIS KERSTAKI is a strain of the *Bacillus* bacterium that only infects caterpillars. The caterpillars must consume the bacteria. Birds, pets, fish, people, etc., cannot catch this strain of the bacterium.

Risks: Very low risks to non-target species (except other caterpillars).

Bacillus thuringiensis kerstaki products: Dipel, Thuricide, others.

BACILLUS THURINGIENSIS ISRAELENSIS is a similar bacterial strain that controls mosquito larvae. Use it in water containers or ponds where mosquitoes are a problem. It is very effective for controlling mosquito larvae.

Risks: Very low risks to non-target species (except fly larvae).

Bacillus thuringiensis israelensis products: Mosquito Bits, Mosquito Dunks, others.

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 landscape or garden. Risks: Very low risks to non-target species (except beetle larvae).

Bacillus popillae products: Milky Spore granules, Milky Spore powder, others.

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 landscape. 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 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. Yellow jacket holes can be sealed with a glass bowl to eliminate the colony. The bowl must fit tightly to the ground or the yellow jackets will escape under the edge. Only approach yellow jacket nests in the evening or early morning to reduce the risk of stings.

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. Thorough coverage of the plant is required, or you will simply chase the insects from one part of the plant to another.

ADDITIONAL RESOURCES

Contact your local Extension agent!

omri.org	Organic Materials Review Institute and the National Organic Standard. Includes a list of all of the pest management chemicals accepted as organic.
attra.ncat.org/organic	National Sustainable Ag Information Service. This site has a great deal of information about organic production, including pest management.
ams.usda.gov/about-ams/programs-offices/national-organic-program	USDA National Organic Program.

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ORGANIC-APPROVED FUNGICIDE/ BACTERIACIDE OPTIONS

The products listed in this section are approved for use in organic production. All disease management products must be used as a preventative and they will have little effect against established disease. Coppers, sulfurs, oils, and potassium bicarbonate are on the list as naturally occurring minerals. These products are non-specific and can be toxic to humans, plants and many non-target invertebrates and aquatic life. Read the label before applying. In addition, the effectiveness is limited when compared to “conventional” pesticides. The second category are live biological products containing naturally

occurring bacteria and fungi. These have very limited effectiveness. 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 IPM program that stresses natural biological diversity. For the home gardener, there is little need for these products and most diseases can be managed without chemical intervention. For a complete list of organic approved products visit the Organic Materials Review Institute’s (OMRI) website: <https://www.omri.org/omri-lists>.

Major Organic-Approved Products for Disease Management

TYPE OF DISEASES CONTROLLED	COMPOUND	NOTES
COPPER		
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. Labeled for many plants.	<i>copper sulfate</i> and <i>fixed coppers (copper hydroxide, copper oxide, copper oxychloride)</i>	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 that 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 but may no longer be readily available.	<i>bordeaux mixture (hydrated lime/copper sulfate)</i>	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.
SULFUR		
Controls some fungal diseases of fruit, vegetables and ornamentals. Most effective on powdery mildew, but may have some control of other diseases. Check label.	<i>elemental sulfur</i> (dry wettable <i>sulfurs</i> of flowable <i>sulfurs</i>)	Should not be used when the temperature is above 90°F or within four weeks of an oil spray as injury to the foliage may occur. Refer to individual product label for plants that may be treated and which may be harmed by <i>sulfur</i> . <i>Sulfur</i> is lethal to beneficial insects, spiders, and predatory mites leading to increased problems with certain pests including mites. Residue may be a problem.
OTHER COMPOUNDS		
Some control of insect vectors of viruses and a few fungal diseases such as powdery mildews and black spot.	Oils, horticultural, narrow range oils such as dormant, suffocating and summer oils	Do not apply when <i>sulfur</i> compounds have or will be used. This combination is toxic to the plant. Repeated use can cause build-up in the soil.
Has some efficacy against foliar fungal diseases, in particular powdery mildew on various hosts.	<i>potassium bicarbonate</i>	Diluted in water and often mixed with insecticidal soap (surfactant) and horticultural oil to increase effectiveness.
Biological product made from the fermentation of the bacterium <i>Bacillus subtilis</i> species. Limited control of foliar and fruit diseases.	<i>Bacillus subtilis</i> Serenade MAX Sonata Double Nickle	Limited effectiveness against most diseases. Best used in a rotation with other NOP-approved products
Strain of a naturally occurring soil bacterium. Effective against soil pathogens such as <i>Pythium</i> , <i>Rhizoctonia</i> , and <i>Fusarium</i> . Also some foliar diseases such as downy and powdery mildew and <i>Alternaria</i> . May be more effective against soil pathogens.	<i>Streptomyces lydicus</i> Actinovate AG Actinovate Lawn and Garden	Limited effectiveness and must be used together with cultural methods of disease suppression. Used as a pre-plant soil drench or a foliar spray.