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 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 Cooperative Extension office. Additionally, your local library offers books on organic gardening. Be careful of books from other parts of the country; they may not reflect pest problems in the Southeast. Additionally, many web sites offer information about organic gardening. The best sources of information are university sites (e.g., Fla., Calif.) and established organic research institutes. Beware of home remedies and apparently outlandish ideas; often there is no research to support these claims. Web sites from other countries may offer remedies that are not appropriate for the Southeast United States.

PRINCIPLES FOR ORGANIC GARDENING

- Planning is essential for successful organic gardening.
  - Before you purchase seeds or buy plants, consult UGA Extension information to find out if the things you wish to plant will be suitable for Georgia.
  - Your local UGA Extension agent is an excellent source of information for choosing plants and creating healthy growing conditions.

- Healthy plants are less susceptible to pests and disease. Stressed plants attract 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. UGA Extension offers soil testing with organic alternatives.
  - Plant at the right date and under the proper light/water 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)?
  - UGA 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.
  - Your Extension agent can advise you about crop rotations. Some plants that look different may be closely related.

- Encourage natural controls.
  - An assortment of flowers and herbs will attract beneficial insects.
  - Beneficials need a source of water. During dry periods, spray your garden with water every day or two to give beneficial insects a drink.

- 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.
  - Remove infested or infected plants and leaves/limbs before problems spread to other plants.
Use cultural controls.

- An appropriate planting date may avoid peak pest populations. Most pest populations increase as the season progresses. Planting as early as possible is usually a good idea. You may also want to plant vegetables more than once in the season to maintain a steady supply. Take out the older plants as they develop pest problems.
- Mulch helps keep plants healthy and controls some pests and pathogens.
- Avoid plants or particular varieties that have a lot of pest problems. Some crops, such as peaches, will rarely produce a satisfactory harvest in Georgia without regular applications of synthetic pesticides. Your Extension agent can give you advice.
- Plant extra to allow for losses to pests and mechanical removal. For example, several apple trees will likely yield enough acceptable apples for several pies even though the fruit is not perfect.

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 Cooperative Extension agent.

<table>
<thead>
<tr>
<th>Pest</th>
<th>Chemical Options</th>
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<tbody>
<tr>
<td>Caterpillars</td>
<td>pyrethrins, Bacillus thuringiensis kerstaki, spinosad, neem</td>
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<tr>
<td>Fire ants</td>
<td>spinosad (fire ant bait formulation)</td>
</tr>
<tr>
<td>Thrips</td>
<td>spinosad</td>
</tr>
<tr>
<td>Aphids, whiteflies, other soft bodied pests</td>
<td>pyrethrins, oils, insecticidal soap, neem</td>
</tr>
<tr>
<td>Stink bugs</td>
<td>neem, pyrethrins, spinosad</td>
</tr>
<tr>
<td>Beetles</td>
<td>spinosad, pyrethrins, neem</td>
</tr>
<tr>
<td>Scale insects</td>
<td>oils</td>
</tr>
<tr>
<td>Mites</td>
<td>oils, sulfur, insecticidal soap</td>
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<tr>
<td>Mosquito larvae</td>
<td>Bacillus thuringiensis israelensis</td>
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<tr>
<td>Yellow jackets</td>
<td>traps, pyrethrins</td>
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<tr>
<td>Slugs/snails</td>
<td>iron phosphate</td>
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**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 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 nontarget 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 include 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 can also cause phytotoxicity.

Oil products: There are dozens of products. Look at the list of active ingredients.
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**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** comes in two forms. The organic form is derived from a soil bacterium, *Saccharopolyspora spinosa*. The non-organic form includes some petroleum products as inert ingredients; it is not considered to be organic.

**Risks:** Quite toxic to bees until dry. Low risks for other nontarget species.

Spinosad products: Fertilome, Bulls Eye.

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

**Risks:** Low risks to nontarget species.


**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 products are widely available.

**Bacillus thuringiensis kerstaki** is a strain of *Bacillus* bacteria that only infects caterpillars. The caterpillars must consume the bacteria. Birds, pets, fish, people, etc., cannot 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 in water containers or ponds where mosquitoes are a problem. It is very effective for controlling mosquito larvae.

**Risks:** Very low risks to nontarget 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 yard.

**Risks:** Very low risks to nontarget species (except bettle 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 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 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!**


[www.attra.ncat.org/organic.html](http://www.attra.ncat.org/organic.html) — National Sustainable Ag Information Service. This site has a great deal of information about organic production, including pest management.

ORGANIC FUNGICIDE/BACTERIACIDE OPTIONS

The products listed in this section are registered by the EPA and are approved by the National Organic Program for use in organic production. However, not all formulations are NOP approved and a current list of approved formulations can be found on the Organic Materials Review Institute’s website: http://www.omri.org/omri-lists/download. The effectiveness of most of these products is generally limited when compared to conventional pesticides. 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 can be managed without chemical intervention.

### Major NOP Approved Products for Disease Management

<table>
<thead>
<tr>
<th>TYPE OF DISEASES CONTROLLED</th>
<th>COMPOUND</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td><strong>copper sulfate</strong> and <strong>fixed coppers</strong> (copper hydroxide, copper oxide, copper oxychloride)</td>
<td>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.</td>
</tr>
<tr>
<td>Various diseases of fruits, vegetables and ornamentals including leaf curl on peaches and bitter rot, black rot and scab on apples.</td>
<td><strong>bordeaux mixture</strong> (hydrated lime/copper sulfate)</td>
<td>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.</td>
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<tr>
<td>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.</td>
<td><strong>liquid lime-sulfur</strong> (calcium polysulfides)</td>
<td>Labeled for roses, peaches, pears, brambles, deciduous hedge plants, delphinium, lilacs, euonymous, columbine, crapemyrtle, sweet peas, zinnias, 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. Lime sulfur is very caustic. Wear protective equipment and follow label for dilutions, etc. Also controls mites and scale.</td>
</tr>
<tr>
<td>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).</td>
<td><strong>elemental sulfur</strong> (dry wettable sulfurs of flowable sulfurs)</td>
<td>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. Do not use on apricots, cucumbers, d’Anjou pears, melons, spinach, squash or viburnum as sulfur causes injury and defoliation to these plants. Sulfur is lethal to beneficial insects, spiders and mites leading to increased problems with certain pests including mites. Residue may be a problem.</td>
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</tbody>
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<th>TYPE OF DISEASES CONTROLLED</th>
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<tr>
<td>Some control of insect vectors of viruses and a few fungal diseases such as powdery mildews</td>
<td>Oils, horticultural, narrow range</td>
<td>Do not apply when sulfur compounds have or will be used. This</td>
</tr>
<tr>
<td>and black spot.</td>
<td>oils as dormant, suffocating and</td>
<td>combination is toxic to the plant. Repeated use can cause build-up</td>
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<tr>
<td></td>
<td>summer oils</td>
<td>in the soil.</td>
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<td></td>
<td></td>
<td><strong>OTHER COMPOUNDS:</strong></td>
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<td></td>
<td></td>
<td><strong>potassium bicarbonate</strong></td>
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<td></td>
<td></td>
<td>Diluted in water and often mixed with insecticidal soap (surfactant)</td>
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<tr>
<td></td>
<td></td>
<td>and horticultural oil to increase effectiveness.</td>
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<td></td>
<td></td>
<td><strong>Bacillus subtilis</strong></td>
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<td></td>
<td></td>
<td><strong>Serenade MAX</strong></td>
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<tr>
<td></td>
<td></td>
<td>Limited effectiveness against most diseases. Best used in a</td>
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<td></td>
<td></td>
<td>rotation with other NOP-approved products</td>
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<tr>
<td>Has some efficacy against foliar fungal diseases, in particular powdery mildew on various</td>
<td><strong>Bacillus subtilis</strong></td>
<td></td>
</tr>
<tr>
<td>hosts.</td>
<td><strong>Serenade MAX</strong></td>
<td></td>
</tr>
<tr>
<td>Biological product made from the fermentation of the bacterium <em>Bacillus subtilis</em>. Some</td>
<td><strong>Bacillus subtilis</strong></td>
<td></td>
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<tr>
<td>control of foliar diseases, mummy berry of blueberry and fire blight.</td>
<td><strong>Serenade MAX</strong></td>
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