

Making Sense of Insecticides

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Insecticides are a type of pesticide used to control unwanted insects that may be injurious to ornamental and fruit/vegetable crops. However, with many different insecticides available to home gardeners, choosing the “right” product can be difficult and oftentimes confusing. Before deciding to use an insecticide to control an unwanted insect, home gardeners should understand how insects are classified, how and on which plants insects feed, and if a particular insecticide will control a target pest. Only a relatively small number of insects are considered pests, while many others are considered beneficial. Therefore, it is important to consider how insecticides may impact beneficial insects. **To avoid harm to beneficials, have an expert properly identify the insect before using insecticides.**

As a rule of thumb, choosing the least toxic insecticide that can effectively control the target pest is the best option. Less toxic insecticides are those products that have lower risks to human and environmental health; however, all insecticides, even less toxic or ‘organic’ products, can still cause harm when used incorrectly. In some cases, ‘organic’ products may be more toxic than synthetic or conventional pesticides.

Before choosing an insecticide, first consider the pest you want to control and how it feeds:

- **Chewing insects;** insects like cabbageworms, armyworms, grasshoppers, bagworms, flea beetles, and cucumber beetles feed by chewing on external parts of the plant.
- **Piercing-sucking insects;** instead of actively chewing on plant parts, these insects feed by using specialized mouthparts to suck the sap from plants. Feeding damage will appear as white, yellow, or red spots on leaves, stems, fruits, flowers, or twigs, and may result in curled or deformed plant parts. In extreme conditions, continued feeding and/or high population density may cause wilting and/or death of plants. Aphids, scale insects, squash bugs, leaf-footed bugs, and stinkbugs are all examples of piercing-sucking insects.
- **Internal feeders (borers);** these “boring” insects feed inside the host plant and are either laid as eggs inside the plant tissue by the adult females, or chew their way inside early in their development. Once inside, boring insects will continue to feed until they emerge as adults. Control adults when they emerge or before nymphs enter the plant. Types of borers include red bay ambrosia beetle, leaf miners, and weevils.
- **Below-ground feeders;** insects that feed below ground can damage plants in the same manner as above-ground insects damage plants: chewing on plant roots, sucking sap, boring into roots, and more. Included in this group are grubs, wireworms, rootworms, pillbugs, and woolly apple aphid.

If you decide to use chemical insecticides, make sure that the pest insect has been appropriately identified by a trusted resource. Your local county extension office will have staff on hand who are familiar with many common insects and their control.

Insecticides are classified several ways, but here they are grouped as follows:

- **Contact** insecticides must be applied and come into contact with the target pest to be effective. Thorough coverage is essential, as any part of the plant that is not treated is not toxic and will not control the target pest.
- **Systemic** insecticides are absorbed by a plant and transported throughout its tissues via the vascular system. Because they are first absorbed by the plant, systemic products must be applied *before* you detect an insect infestation. Read the manufacturer's label to determine correct application time.

Read the label, know the difference. Choosing the right product can be intimidating because of the many *brand names* of products on the market. However, there are far fewer *active ingredients* available in insecticides labeled for use in home landscapes. Active ingredients (AI) are the chemicals in an insecticide that kill or control the target weed while *brand names* are how companies distinguish their products. The same active ingredients occur in many brand names. Choose products based on the right *active ingredient*.

Besides the active ingredient, it is necessary to know where, when, how, and on which plants a particular insecticide can be applied.

Make a habit out of thoroughly reading the pesticide label. Reading the label before using any pesticide is critical and necessary because the label contains information on how to mix, apply, store, and dispose of that product safely, protecting you, non-target organisms, and the environment. *Using a pesticide in a manner that is inconsistent with the label is a violation of federal law.*

Undertaker Insecticide

For foliar insect control in turfgrass, landscape ornamentals, and fruit and nut trees.

<i>Active ingredients:</i>	
Carbaryl.....	7.8%
<hr/>	
<i>Other Ingredients</i>	92.2%
<hr/>	
<i>Total:</i>	100.00%

**KEEP OUT OF REACH OF CHILDREN.
CAUTION**

See additional precautionary statements and directions for use inside booklet.

Net contents 1 gal.

THIS LABEL FOR EDUCATIONAL PURPOSES ONLY.

Contact Insecticides

Active Ingredient	Examples of Brand Name	Insects controlled
Azadirachtin*	<ul style="list-style-type: none"> • Azatrol® 	<ul style="list-style-type: none"> • Wide range of piercing/sucking and chewing insects, as well as mites.
<i>Bacillus thuringiensis</i> *	<ul style="list-style-type: none"> • Bonide® Thuricide® • Fertilome® Dipel® Dust • Hi-Yield Thuricide • Monterey Bt RTU • Safer Brand Caterpillar Killer • Southern Ag Thuricide • Worm Whipper 	<ul style="list-style-type: none"> • Tobacco/tomato hornworms, bagworms, armyworms, webworms, and other caterpillar species.
B-cyfluthrin; imdacloprid (<i>contact and systemic properties</i>)	<ul style="list-style-type: none"> • Bayer Dual Action Rose and Flower Insect Killer 	<ul style="list-style-type: none"> • Aphids, whiteflies, japanese beetles (adult), leaf miners, and more.
Bifenthrin	<ul style="list-style-type: none"> • Bifen I/T • Bifen XTS • Bug Blaster II • Hi-Yield Bug Blaster • Knockout Fire Ant Killer • Ortho Fire Ant Killer • Tiger Brand Fire Ant Killer 	<ul style="list-style-type: none"> • Armyworms, cutworms, sod webworm, fire ants, billbugs, and more. See label for full list of insects controlled.
Bifenthrin; carbaryl	<ul style="list-style-type: none"> • Duocide 	<ul style="list-style-type: none"> • Grubs, fire ants, mole crickets, and more. See label for full list of insects controlled.
Bifenthrin; zeta-cypermethrin	<ul style="list-style-type: none"> • Ortho Bug-B-Gon • Ortho Home Defense Lawn and Landscape 	<ul style="list-style-type: none"> • Ants, chinch bugs, cutworms, sod webworm, mole crickets, and more. See label for full list of insects controlled.

Contact Insecticides (cont.)

Carbaryl	<ul style="list-style-type: none"> • Garden Tech Sevin • Sevin Concentrate Liquid 	<ul style="list-style-type: none"> • Armyworm, azalea leafminer, leafhoppers, fall armyworms, and more. See label for full list of insects controlled.
Carbaryl; copper	<ul style="list-style-type: none"> • Dragoon Dust with Copper 	<ul style="list-style-type: none"> • Japanese beetle, lace bugs, aphids, thrips, and more. See label for full list of insects controlled.
Chlorantraniliprole	<ul style="list-style-type: none"> • Scotts GrubEx 	<ul style="list-style-type: none"> • Japanese beetles (grubs), mole crickets.
Deltamethrin	<ul style="list-style-type: none"> • Bengal Ultra Dust 2X Fire Ant Killer • Ortho Insect Killer Rose and Flower 	<ul style="list-style-type: none"> • Aphids, scale insects, white flies, and more. See label for full list of insects controlled.
Esfenvalerate	<ul style="list-style-type: none"> • Bengal Lawn and Garden Insect Control • Monterey Bug Blaster II 	<ul style="list-style-type: none"> • Aphids, armyworms, cucumber beetles (adults), squash bug, squash vine borers, and more. See label for full list of insects controlled.
Gamma-cyhalothrin	<ul style="list-style-type: none"> • Spectracide Triazicide Insect Killer 	<ul style="list-style-type: none"> • Aphids, cutworms, lace bugs, scale insects (crawlers), thrips, and more. See label for full list of insects controlled.
Lambda-cyhalothrin	<ul style="list-style-type: none"> • Bonide Beetle Killer • Eight Insect Control • Martin's Cyonara • QualiPro • Revenge Ant Killer • Spectracide Fire Ant Mound Destroyer • Spectracide Fire Ant Shield • Sunniland Chinch Bug Spray • Terro Ant Killer plus Multi-purpose Insect Control 	<ul style="list-style-type: none"> • Ants, armyworms, lacebugs, striped oakworm, scale insects (crawlers), and more. See label for full list of insects controlled.
Mint oil; geraniol	<ul style="list-style-type: none"> • Ecologic Lawn and Insect Killer 	<ul style="list-style-type: none"> • Ants, aphids, chinch bugs, armyworms, cutworms, sod webworms, and more. See label for full list of insects controlled.

Contact Insecticides (cont.)

Mineral oil	<ul style="list-style-type: none"> • Bonide All Seasons • Hi-Yield Dormant Spray • Parafine Horticultural Oil • Southern Ag Parafine Horticultural Oil 	<ul style="list-style-type: none"> • Scale insects, mealybugs, leaf rollers, and more. Also controls some diseases such as powdery mildew, see label for full list of insects and diseases controlled.
Neem oil	<ul style="list-style-type: none"> • Bayer Advanced Natria Neem Oil • Bonide Neem Oil • Bonide Rose Rx • Garden Safe Fungicide 3 • Southern Ag Triple Action 	<ul style="list-style-type: none"> • Scale insects, mealybugs, leaf rollers, and more. Also controls some disease like powdery mildew; see label for full list of insects and diseases controlled.
Permethrin	<ul style="list-style-type: none"> • Bonide Ant, Flea, and Tick Killer • Bonide Borer-Miner Killer • Bonide Eight Insect Control • Hi-Yield 38-Plus Insect Control • Hi-Yield Indoor/Outdoor Broad Use Insecticide • Knockout Indoor/Outdoor Insect Killer • Martin's Permethrin • Super 10 	<ul style="list-style-type: none"> • Beetles, bagworms, fire ants, cutworms, leafhoppers, stink bugs, and more. See label for full list of insects controlled.
Potassium salt of fatty acid (insecticidal soap)	<ul style="list-style-type: none"> • Bonide Insecticidal Soap • EarthTone Insecticidal Soap • Miracle Gro Nature's Care Insecticidal Soap • Safer Brand Insect Killing Soap • Safer Rose and Flower Insect Killer • Safer Tomato and Vegetable Insect Killer 	<ul style="list-style-type: none"> • Aphids, lacebugs, mealybugs, thrips, whiteflies, and more. See label for full list of insects controlled.
Potassium salt of fatty acid; pyrethrins; neem extract	<ul style="list-style-type: none"> • Safer End-All Insect Killer* 	<ul style="list-style-type: none"> • Aphids, beetles, caterpillars, whiteflies, and more. See label for full list of insects controlled.

Contact Insecticides (cont.)

Propiconazole; lambda-cyhalothrin	<ul style="list-style-type: none"> • Black Flag Lawn Insect Killer • Spectracide Immunox for Lawns 	<ul style="list-style-type: none"> • Armyworms, cutworms, sod webworms, and more. See label for full list of insects controlled.
Pyrethrin	<ul style="list-style-type: none"> • Bonide Garden Dust • Miracle Gro Nature's Care 3-in-1 Insect, Disease, and Mite Control • Monterey Bug Buster-O • Monterey Fruit Tree Spray 	<ul style="list-style-type: none"> • Aphids, mites, cutworms, and more. See label for full list of insects controlled.
Pyrethrin; canola oil	<ul style="list-style-type: none"> • EarthTone Insect Control 	<ul style="list-style-type: none"> • Aphids, mites, scale insects (crawlers), and more. See label for full list of insects controlled.
Pyrethrin; neem oil	<ul style="list-style-type: none"> • Ferti-lome RTU Triple Action 	<ul style="list-style-type: none"> • Aphids, mites, scale insects (crawlers), and more. See label for full list of insects controlled.
Pyrethrin; piperonyl butoxide; neem oil	<ul style="list-style-type: none"> • Bonide Bon-Neem • Ferti-lome Fruit Tree Spray with neem • Ferti-lom RTU Triple Action 	<ul style="list-style-type: none"> • Aphids, mites, stink bugs, boxelder bugs, and more. See label for full list of insects controlled.
Rosemary oil; peppermint oil; thyme oil; clove oil	<ul style="list-style-type: none"> • EcoSmart Garden Insect Killer* 	<ul style="list-style-type: none"> • Aphids, beetles (plant-feeding) leafhoppers, stink bugs, and more. See label for full list of insects controlled.
Rosemary oil; sesame oil; peppermint oil; thyme oil; cinnamon oil; garlic oil	<ul style="list-style-type: none"> • Dr. Earth Final Stop Vegetable Garden Insect Killer* • Dr. Earth Rose & Flower Insect Killer* 	<ul style="list-style-type: none"> • Aphids, whiteflies, caterpillars, leafhoppers, and more. See label for full list of insects controlled.
Seasme oil	<ul style="list-style-type: none"> • Organaocide 3-in-1 Garden Spray* 	<ul style="list-style-type: none"> • Aphids, whiteflies, and more. See label for full list of insects controlled.
Sulfur; pyrethrin	<ul style="list-style-type: none"> • Bonide Tomato and Vegetable • Earth Tone 3-in-1 Disease Control • Ortho 3-in1 	<ul style="list-style-type: none"> • Aphids, whitefliers, spider mites, Japanese beetles, and some diseases like powdery mildew. See label for full list of insects and diseases controlled.

Contact Insecticides (cont.)

Thyme oil; geraniol; cinnamon oil; peppermint oil	<ul style="list-style-type: none"> • Maggie's Farm 3-in-1 Garden Spray* 	<ul style="list-style-type: none"> • Thrips, stinkbugs, aphids, mealy bugs, mites, and more. See label for full list of insects controlled.
Trichlorfon	<ul style="list-style-type: none"> • Bayer Advanced Grub Killer Plus 	<ul style="list-style-type: none"> • Japanese beetle grubs, ants, bill bugs, and cutworms.

*Approved for use in organic gardening.

Systemic Insecticides

Active Ingredient	Brand Name	Type of insects controlled
Imidacloprid	<ul style="list-style-type: none"> • Bayer Advanced Fruit, Citrus, and Vegetable Insect Control • Bayer Advanced Tree and Shrub Protect and Feed • Bonide Annual Tree and Shrub Control with Systemaxxx • Bonide Systemic Granules • Bonide Systemic Insect Spray RTU • Hi-Yield Systemic Insect Granules • Ferti-lome Tree and Shrub Insect Drench 	<ul style="list-style-type: none"> • Adelgids, aphids, armored scales, leaf beetles, plant bugs, mealybugs, and more. See label for full list of insects controlled.
Imidacloprid; taufluvinate; tebuconazole	<ul style="list-style-type: none"> • Bayer Advanced 3-in-1 Insect, Disease, and Mite Control 	<ul style="list-style-type: none"> • Aphids, caterpillars, Japanese beetles, whiteflies, and more. See label for full list of insects controlled.
Malathion	<ul style="list-style-type: none"> • Bonide Malathion Insect Control • Hi-Yield 55% Malathion • Ortho Malathion Insect Spray • Southern Ag Malathion • Spectracide Malathion Insect Spray • Tiger Brand Malathion 	<ul style="list-style-type: none"> • Scale insects, thrips, Japanese beetles, and more. See label for full list of insects controlled.
Spinosad**	<ul style="list-style-type: none"> • Bonide Colorado Potato Beetle Beater Concentrate • Bonide Flower, Vegetable, and Garden Dust • Capt. Jack's Dead Bug Brew 	<ul style="list-style-type: none"> • Codling moth, armyworms, fruit flies, webworms, bagworms, fire ants, and more. See label for full list of insects controlled.

	<ul style="list-style-type: none"> • Capt Jack's Vegetable and Garden Dust • Monterey Garden Insect Spray • Ortho Tree and Shrub • Southern Ag Payback Fire Ant Bait 	
Tebuconazole; imidacloprid	<ul style="list-style-type: none"> • Bayer Advanced All-in-One Rose and Flower • Bonide Rose Rx Systemic Drench • Ferti-lome 2-in-1 Systemic 	<ul style="list-style-type: none"> • Aphids, lace bugs, leaf beetles, leafhoppers, and more. See label for full list of insects controlled.

**This is a *translaminar* product and is only locally systemic. To be effective, these products must be applied on the parts of plants where insects feed.

Data collection on available insecticides made possible with the efforts of the Extension Master Gardener Volunteers of Brunswick County, Class of 2017.

Learn More with these Online Resources!

Extension Gardener Handbook:

<https://content.ces.ncsu.edu/extension-gardener-handbook/appendix-b-pesticide-safety>;

NC Cooperative Extension Gardening Portal:

<https://gardening.ces.ncsu.edu/>

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