Cornell University
Cooperative Extension

INSECTICIDAL SOAP

What is it?
Insecticidal soaps are among many choices available for controlling pest problems in horticultural crops, on houseplants, and in the home garden or landscape. They are pesticides formed by the chemical interaction of oils or fats with potassium hydroxide to create water-soluble potassium salts of fatty acids. These are not the same as household soaps and detergents, but are specially selected and formulated products designed to minimize risk of plant injury while providing control of plant pests. Various fats and oils can be used to make insecticidal soap; one kind is even made from neem seed oil.

How does it work?
Insecticidal soap is used as a dilute spray and only works on contact by disrupting the insect or mite cuticle and cell membranes, meaning the spray solution must coat the target pest. Once the spray has dried, an insect will not be harmed by walking over the residue. For example, spraying the upper leaf surface will not control whiteflies, which usually feed on the underside of the leaves. Good coverage, therefore, is extremely important.

What does it control?
Insecticidal soap is used to control many pests, such as adelgids, aphids, mealybugs, whiteflies, mites and others on a wide variety of food and ornamental plants. Although generally not effective on larger insects, we have found insecticidal soap to be very effective in controlling early instar larvae of viburnum leaf beetle. Some can control certain plant diseases such as powdery mildew.

What role should it play in pest management?
Typically, insecticidal soap is applied at a concentration of 1 - 2%, although other rates are occasionally used for some pests. Lower rates are sometimes included in sprays with other materials to provide suppression or quick knockdown or to enhance the activity of other insecticides in a tank mix. Insecticidal soaps should be used when infestations appear and not preventively; they are only applied when needed because they have no residual activity. Use only on labeled plants and pests and at recommended use rates

Avoid treating sensitive plants. Watch for phytotoxicity (plant injury): some plants are known to be sensitive. Symptoms on foliage include yellow or brown spotting, "burned" tips, and/or yellow or brown scorching on the leaf edges. Soap spray may also cause marking on some pome (apple, pear, etc.) and stone fruit varieties especially at points where spray collects. Chances for injury increase with frequency of application. Repeat applications at short intervals are not advised. Do not treat plants under drought or other stress (e.g. newly transplanted material, unrooted cuttings), since they may be especially at risk of damage. Some plants are known to be more sensitive than others to insecticidal soap sprays, including certain varieties of azaleas, begonias, camellias, fuchsias, geraniums and impatiens; use caution when treating conifers, especially if tender new growth is present and when stressful conditions are expected. Plants with hairy leaves or parts where liquid spray remains for a long period may be more prone to injury from soap. Rinse plants with a clean water spray if they show signs of wilting within a few hours after treatment. Test insecticidal soap first on a small part of palms, delicate ferns, ornamental ivies, and succulents before treating an entire plant or area. Following is a list of plants reported to show injury after treatment.

Plants that may be sensitive or are reported to show sensitivity to insecticidal soap sprays

*Horse chestnut	*Aesculus hippocastanum*	Maidenhair fern	*Adiantum pedatum*
*Mountain ash	*Sorbus americana*	Crown of thorns	*Euphorbia milii*
*Japanese maples	*Acer palmatum*	Chrysanthemum	*Chrysanthemum* spp.
Gardenia	*Gardenia* spp.	Nasturtiums	*Nasturtium* spp.
Common baldcypress	*Taxodium distichum*	*Bleeding heart	*Dicentra formosa*
Narrow-leaved evergreens	*Picea, Pseudotsuga, Tsuga, Abies*, etc.	Easter lilies (during bud formation)	*Lilium longiflorum*
Redbud	*Cercis* spp.	Asiatic and oriental lilies	*Lilium* spp.
River birch	*Betula nigra*	Jade plant	*Crassula ovata*
Poinsettia	*Euphorbia pulcherrima*	*Sweet pea	*Lathyrus odoratus*
Lantana	*Lantana* spp.	Cucumber	*Cucumis sativus*
Ornamental ivy		Begonia	*Begonia* spp.
Dieffenbachia	*Dieffenbachia* spp.	Fuchsia	*Fuchsia* spp.
Schefflera	*Schefflera*, *Brassaia*	Zebra plant	*Aphelandra squarrosa*

*very sensitive - do not apply to these plants

GUIDELINES FOR SAFE USE OF INSECTICIDAL SOAP

Wait for new growth to harden off before treating. Tender, young foliage of evergreen trees or shrubs may be most sensitive. Fruit and nut trees in bloom also should not be sprayed. If ever in doubt, test a small part of a plant first. If the plant is sensitive, phytotoxicity symptoms should appear after 48 hours.

Apply when the temperature is below 90^0 F and not in full sun. High temperatures and high relative humidity may increase plant stress and sensitivity. The best time to apply insecticidal soap is in the early morning. The material works only while wet, and the slower drying conditions in early morning favor better control.

Compatibility with other pesticides and fertilizers. Insecticidal soap is compatible with many other kinds of pesticides, but should not be mixed with spreader-stickers, rotenone-based insecticides, certain fungicides containing metal ions, lime sulfur, copper sulfate, or other copper fungicides such as Bordeaux mixture. Do not apply within three days of a sulfur application. It should also not be combined with concentrated mineral fertilizers for spraying on foliage.

Compatibility with hard water and pH. Soft water is best for diluting to the proper strength. Soap combines with and is precipitated by certain minerals in hard water, especially calcium, iron and magnesium. Test for compatibility by allowing a quart of the prepared spray solution to stand for 15 minutes. The solution should normally be a light, milky color. If a scum or "curd" of soap scale appears on the surface or hardness in tests exceeds 300 ppm (17.5 grains/gal.), the need for a water conditioner is indicated. Potential for plant injury is greater when pH of the spray solution is lowered below 8.0.

Currently registered products

Home garden: Several products under Safer, Concern, Bonide, Garden Safe and Surefire brands; Organica K+Neem

Commercial: M-Pede, Revoke (discontinued), Organica K+Neem