

Horticulture Oils

Probably every gardener or anyone who has even thought about being a gardener has heard of horticultural oils. While use of horticultural oils has been an effective method of controlling certain insects and diseases since the 1880's, many people do not fully understand them or their proper use. In the following article, I will explain what they are, what can they be used on and how do you use them.

derived oil from the seeds of the neem tree *Azadirachta indica*. More on neem oil next month. Horticultural oils work by suffocation when the oil covers the insect body blocking the spiracles or breathing openings. There is evidence that they may also interact with fatty acids in the insect's cells thus disrupting cell membranes and metabolism. They may also act as an antifeedant for some leaf chewing



Initially these oils were mostly used as dormant oils applied on woody species before spring budbreak to control susceptible pests and reduce initial fungal inoculation loads. As refinement techniques improved, highly refined horticultural oils extended their usefulness to herbaceous plants and to year-round use. Essentially all commercial horticultural oils available today are highly refined petroleum products sometimes known as mineral oils. Oil impurities associated with plant injury, such as aromatic compounds and compounds containing sulfur, nitrogen or oxygen, are removed. Filtration, distillation and dewaxing produces the finished base oil. Final pesticidal formulations normally have an added emulsifier so the product will mix well with water. These products are usually used at a 2% dilution rate. Plant-derived oils such as cottonseed oil and soybean oil are also sometimes used but their efficacy is more variable and often not as good as petroleum-derived oils. Neem oil is another plant-

insects. Horticultural oils are also disruptive to fungal hyphae that grow on the leaf surface such as powdery mildew. Because of their mode of action, development of resistance is also highly unlikely.

Horticultural oils are contact pesticides so for best results and complete (100%) coverage is absolutely essential for good control. Any insect or egg that is not covered will not be killed. Small spray droplet size facilitates total coverage. Be sure to treat both sides of the leaves as well as the trunk, limbs, and buds.

Horticultural oils are safe to mammals, birds and reptiles but is toxic to fish. Horticultural oils should be used in a manner that prevents stream, pond or drainage contamination. Breathing the oil mist should also be avoided as it can be an irritant or cause pulmonary problems. Follow the label directions for use and proper protective equipment. Horticultural oils are easy to apply with inexpensive equipment and quickly dissipate through evaporation.

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The primary limitation of horticultural oils is their small but real phytotoxic potential on certain plants or under certain conditions. They may also stain some surfaces.

Some recommended precautions to avoid damage are:

- 1) Avoid using on or allowing drift to plants that tend to be sensitive (hickories, junipers, cedars, maples, redbud, etc.)
- 2) Do not apply when temperatures are below 40°F or above 90°F. Freezing temperatures can cause the emulsion to breakdown, cause uneven coverage and delay drying. High temperature damage is usually related to drought stress. High humidity (above 90%) can contribute to injury risk and lower the safe upper temperature limit. Dry conditions generally reduce risk of plant injury to plants that aren't drought stressed.
- 3) Do not apply to wet plant surfaces or when rain is likely. These conditions inhibit oil evaporation/drying and increase plant injury risk.
- 4) Do not use in combination with sulfur-containing pesticides or if sulfur containing pesticides have been recently applied (e.g. Captan). Sulfur compounds can react with oils to form phytotoxic compounds.
- 5) Horticultural oils are non-selective so avoid spraying when pollinators or beneficial insects are active on the plant. Once horticultural oils are dry, they pose no threat to pollinators or beneficials

but they will kill any beneficial insects such as lady beetle larvae or predator mites that are on the plant at the time of the application.

- 6) Application to plants in flower may result in spotting on the flowers. Weigh the benefits of application vs the damage done to the flowers.



- 7) Do not use on young seedlings or tender young shoots – damage of tender tissue is likely. If you are unsure if your plant is sensitive to horticultural oils, you should mix your material and spray a small area. , Phytotoxic damage will be evident within 24-48 hours if the plant is sensitive or conditions are not appropriate.
- 8) Horticultural oils are contact pesticides with little to no residual effect so follow the label for reapplication intervals. Horticultural oils are used to control aphids, mites, scale insects, leafhoppers, adelgids, spider mites, whiteflies, thrips, mealy bugs, fungus gnats, lace bug, young caterpillars, leaf

miners, powdery mildew and some rusts. It is also useful to prevent transmission of some plant viruses and they are also effective against pest eggs.

Horticultural oils are an extremely safe and effective means of control for several plant insect and mite pests as well as some diseases. They are an important part of most integrated pest management (IPM) programs and there are formulations available that can be used in organic gardening. Most gardeners should consider using horticultural oils as part of their pest control protocol. Always use oils produced and labelled for horticultural use.

~Dr. Joe Willis