



# Horticultural Oils

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**Horticulture**

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College of Agriculture,  
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**EXTENSION**  
It Starts With Us

- A growing interest in organic gardening combined with risks (perceived or not) related with traditional synthetic products, has increased attention in natural products used in the garden or landscape
- Petroleum-derived and Plant-based oils are a group of natural pest control products that can be effectively used in your garden



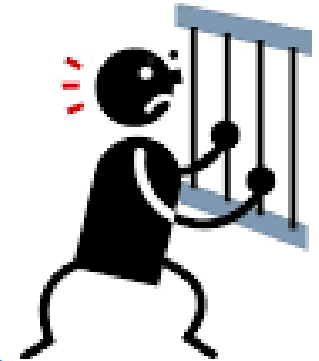
extension  
ALABAMA A&M & AUBURN UNIVERSITIES

# Don't Forget!

- Check the label for plants with known intolerance for oil sprays
- It is a violation of federal law to use these products in a manner inconsistent with its labeling



THE LABEL  
IS THE LAW!





# WHAT'S THE DIFFERENCE?

- DORMANT OILS
- HORTICULTURE OILS
- INSECTICIDAL SOAP

# Dormant Oils

- derived from paraffinic crude oil
- Heaviest (viscous) of the petroleum-based oil sprays with a low unsulfonated\* residue
- Proper timing is critical when using dormant oil sprays. Dormant oils should be applied before breaking dormancy (before “bud break”)
- Dormant oils suffocate pests
- Dormant oils are typically applied when temperatures will remain above 40°F. for 24 hours.
- If
- applied just below freezing temperatures, the emulsion breaks down, causing the oil to adhere to the bark/leaves and the targeted insect stage





# Dormant Oils

- Applied at 2-4% rates during winter in order to suffocate insects & mites that overwinter eggs or mature females
- Treat the eggs of: aphids, southern red mites, spruce spider mites, oak spider mites, spruce gall adelgids, lace bugs (deciduous plants), cankerworms psyllids, etc.
- Scale Insects (e.g., pine needle scale, striped pine scale, Kermes scale, cottony maple scale)





1 Dormant



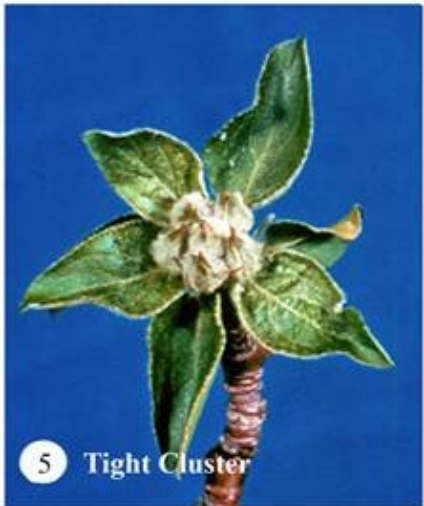
2 Silver tip



3 Green tip



4 Half-inch green



5 Tight cluster



6 Pink



7 Bloom



8 Petal fall



9 Fruit set

# Phenology

- refers to the timings of cyclical or seasonal biological events, such as migrations, egg laying, flowering, and hibernation
- AND WHEN TO SPRAY TREES AND PLANTS
- Many species of plants and animals have life cycle events that are influenced by climatic factors



## • Horticultural Oil

- Historically, all horticultural oils were called “dormant” oils
- sprayed only when plants, particularly fruit and shade trees, were in a dormant stage of growth BEFORE BUD BREAK
- As refining processes improved, “superior” oils were developed
  - lighter weight
  - contained no sulfur
  - less likely to burn plants than traditional dormant oils
  - mixed in the proper concentration can be applied, with some precautions, during the growing season when plants are in full leaf





# FORMS

The oil is usually combined with some type of emulsifying agent so that it can be mixed with water and used as a spray

- dilute a bottle of **concentrate** and apply with a sprayer
- **ready-to-spray** formulations
  - simpler to use but more expensive





# CONTROL

- Controls soft-bodied insect or mite pests
- Direct contact (smothering and repelling)
- Act quickly
- Low toxicity
- Low-risk fungicide for suppression of powdery mildew, rust, and sooty mold
- Broad-spectrum action- any insect contacted by oil could be affected
- limited residual activity (LRA) )can help avoid harm to beneficial insects and other organisms
- Because of LRA, can't prevent insect re-invasion
- need to be reapplied





# Horticultural Oil

- collective term for a group of oil-based products refined specifically for use on plants (mineral oil)
- some are made from grains, vegetables or neem tree seed
  - Some vegetable oils - cottonseed oil and soybean oil
- work best when spray comes in contact with the pest
- Once dry, does not have much effect and becomes safer for pollinators and beneficial insects
- can be safely used at any time to control pests on plants that are not attractive to pollinators
- spray at dawn or dusk (when pollinators are not present) for pollinator-attractive plants
- Some oils are organic – use approved



# Horticultural Oil

- excellent control of armored scales
  - Euonymus scale and oystershell scale, and can also be used for aphids, whiteflies, spider mites, true bugs, caterpillar and sawfly larvae and more
- recommended concentration of horticultural oils for pest control is usually 2%
  - However, some plants are sensitive to oils
    - Japanese maple, red maple, hickory, black walnut, plume and smoketree (*Cotinus coggygria*), Colorado blue spruce, redbud, juniper, cedar, cryptomeria and Douglas fir Plant
    - injury are discoloration, yellowing, leaf or flower browning (necrosis), black spots
    - Do Not apply during high humidity or high temperatures - toxic effect on plant growth



- Do not use oils on certain sensitive plants ( can burn leaves)
  - Plants having hairy leaves are more sensitive since they retain the oil for a longer amount of time
  - Plants under drought stress may have increased risk of injury
  - Color
  - Horticultural oil applications are not advised when outdoor temperatures exceed 90°F

# Neem Oil

- extracted from the seeds of the neem tree
- contains at least two compounds, azadirachtin and salannin, that kill insects
- other unidentified compounds that have fungicidal qualities
- most effective against actively growing, immature insects.
- repellent, feeding deterrent, and/or growth regulator, depending on the formulation and the insect
- Neem oil @70% used as fungicide
  - manage powdery mildew >effective on black spot, other leaf spot diseases




*A neem tree with fruit. Neem oil is derived from the Bitter seeds of this fruit. Photo by Rajib Ghosh, University of Florida- Biopesticides*



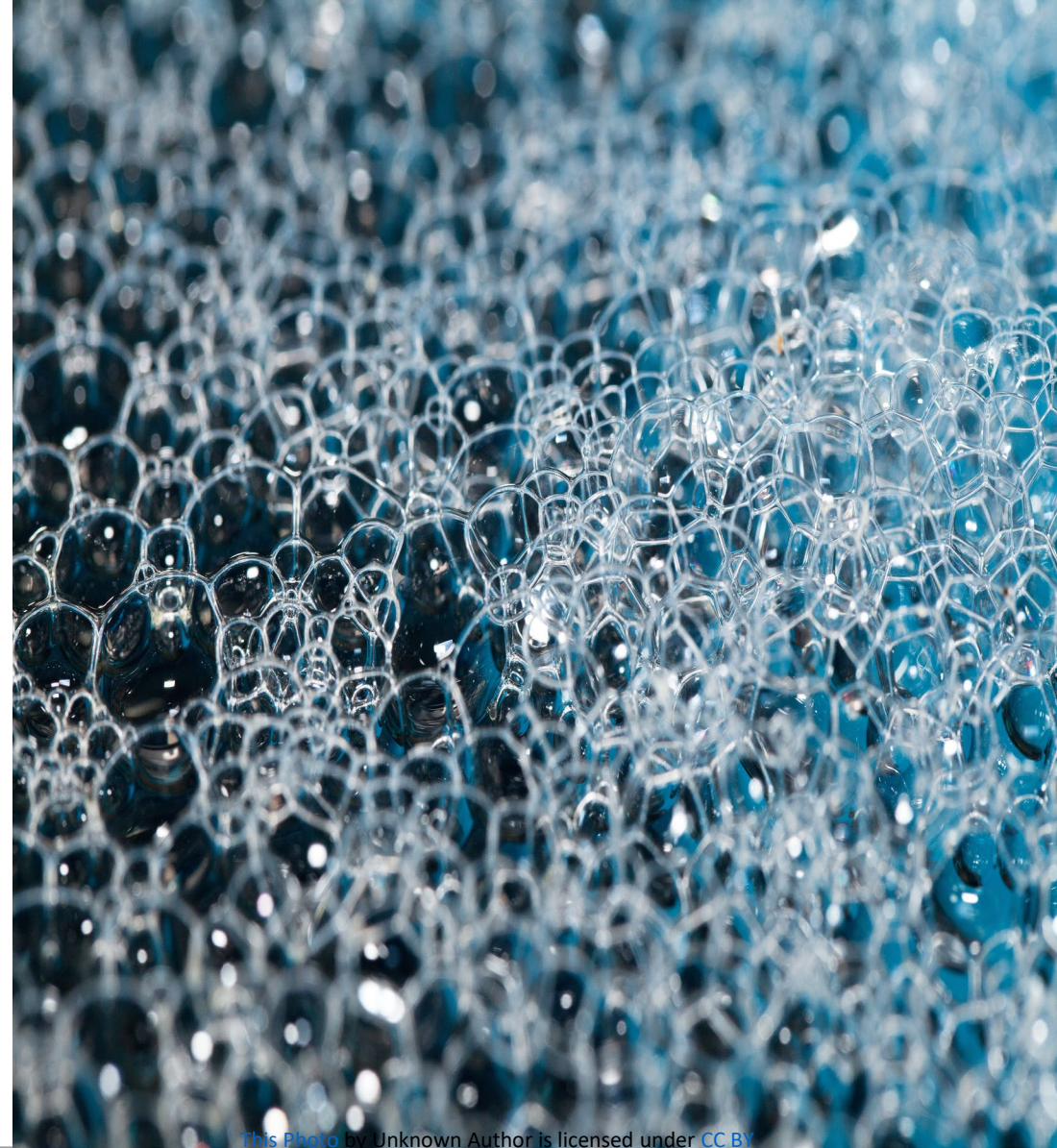


# Citrus Oils

- extracted from citrus fruit peels
- refined to make the insecticidal compounds d-limonene and linalool.
- Both compounds are generally regarded as safe for mammals by the United States Food and Drug Administration (FDA)
- no residual activity
  - compounds evaporate readily from treated surfaces
  - registered for use against fleas, aphids, and mites
  -  compounds also kill fire ant workers, several types of flies, paper wasps, and house crickets
- cautiously use these products to minimize leaf burn on sensitive plants
- READ THE LABEL

# Insecticidal Soap

- Commercially insecticidal soaps are made of potassium salts of fatty acids
- Applied as a foliar application (sprayed)
- Effective on a wide range of plant pests
  - effective on soft-bodied insects - aphids, adelgids, lace bugs, leafhoppers, mealybugs, thrips, sawfly larvae, spider mites and whiteflies
- Contact spray - work best when contact with pest
- Disrupts the structure and permeability of insect cell membranes
- Once dry, not effective
- Once dry, becomes safer for pollinators and beneficial insects
- Spray at dawn or dusk (when pollinators are not present) for pollinator-attractive plants



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# Insecticidal Soap

- 3% may cause some leaf or flower injury
- 1.5% may injure sensitive plants
- READ THE PRODUCT LABEL
- of spray injury, which include yellow, black or brown spots, brown (necrotic) edges on leaf and petal tips, scorch or discoloration
  - sensitive - horse chestnut, mountain ash, Japanese maple, sweet gum, jade plant, lantana, gardenia, bleeding heart, sweetpeas, crown-of-thorns and some cultivars of azaleas, begonias, chrysanthemum, fuchsias and impatiens
- Do not prepare your own spray from dish-washing detergents or other household cleaners – can be be more toxic to plants

# List of Terms

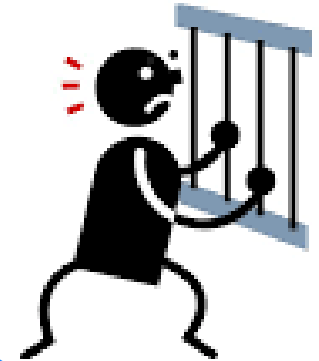
- Delayed Dormant Oil – Oil applied when buds are showing 1/16 to ½ inch of green.
- Dormant Oil – Oil applied to woody plants during dormant stage of growth (winter) before buds open in the spring at a higher concentration than summer oil. Refers to season of application.
- Horticultural Oil – A pesticide used to control insects, mites and some diseases. May be petroleum- or plant-based.
- Nonselective – Kills all insects, including beneficial insects.
- Phytotoxicity – Plant injury due to a toxic effect by a compound.
- Summer Oil – Oil applied when plants are in leaf at a lower concentration than dormant oil. Sometimes called superior oils. Refers to season of application.
- Superior Oil – Oil that doesn't contain sulfur and can be applied when plants are in leaf. Also called supreme oil.
- Supreme Oil – Highly refined oil. Similar to a superior oil.

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- HORTICULTURAL OILS
- Created by Sharon P. Flynt, agent for Horticulture,  
Scott County Cooperative Extension
- August 1, 2023

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## RESOURCES

USA National Phenology Network <https://www.usanpn.org/home>

THE JENTSCH LAB

INSECT BIOLOGY, ECOLOGY, AND MANAGEMENT IN HUDSON VALLEY AGRICULTURAL  
COMMODITIES

Iowa State University - <https://hortnews.extension.iastate.edu/faq/when-should-dormant-oil-sprays-be-applied-apple-trees>

Planet Natural Pest Solver <https://www.planetnatural.com/pest-problem-solver/beneficial-insects/>

Virginia Polytechnic Institute and State University

University of Florida/IFAS Biopesticides: Horticultural Oils - Natural pest control with oils

Horticultural Oils: Myth, Miracle or Marketing, Linda Chalker-Scott, Ph.D., Puyallup  
Research and Extension Center, Washington State University Puyallup, Washington

Colorado State University Extension, Insect Control: Horticultural Oils – 5.569

Rutgers University, Rutgers Cooperative Extension; A Primer on Dormant Oil Applications

Kansas State University, Extension Entomology; Dormant Oils, Dr. Raymond Cloyd

University of Nevada, Reno Extension, What a Gardener Needs To Know/Horticultural Oils





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U.S. Department of Agriculture  
Office of the Assistant Secretary for Civil Rights  
1400 Independence Avenue, SW  
Washington, D.C. 20250-9410; or

**fax:**  
(833) 256-1665 or (202) 690-7442;

**email:**  
[program.intake@usda.gov](mailto:program.intake@usda.gov).

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**correo postal:**  
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