

MARCH/APRIL 2019

Mosquito Q&A | 4-H Youth Study Insects at Insectathon

# PESTPRO

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**Powerful Stings**

**Insecticidal Soaps**

**Common Web Spiders  
In the Landscape**







# SOAP:

**Any soap can cause plant damage and harm beneficial insects if used incorrectly.**

## *Pest Control Product, Monitoring Tool, or Cleaner?*

*Damage to a stressed sugar-apple (*Anona* sp.) tree caused by an insecticidal soap application on a hot, sunny afternoon. Photo by Matthew Borden, UF/IFAS*



Adam G. Dale and  
Matthew A. Borden

**I**NSECTICIDAL soaps are great tools for controlling soft-bodied plant pests while providing an excellent product to include in an insecticide rotation. Dish soap mixed with water can also be a valuable tool to survey subterranean insects like mole crickets.

An important difference between these two recommendations is the type of soap being used and its purpose. Unfortunately, if this difference is unclear, there is limited and conflicting information available on the web. However, there are important differences among soap products and their proper, legal and safe use to manage pests.

### **Common soaps**

**Insecticidal soaps** — Insecticidal soaps are formulated specifically to control insect and mite pests and are intended to be safe for plants when following the label instructions. These products are effective against many soft-bodied pests like aphids, soft scales, mealybugs, and spider mites. However, they require direct contact with the pests to be effective because they have no residual toxicity.

**Dish soaps** — Typically detergents, these products are designed to strip grease and oily residue off cookware and other surfaces, which makes them great for cleaning and sanitation.

**Castile soaps** — Castile soaps are produced with vegetable oils. They are often mixed with fragrances and essential oils and sold for a wide range of household cleaning or cosmetic purposes.

*Continued*





Insecticidal soap label



Insecticidal soap



Dish detergent



Castile soap

Manufacturer photos

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## Important differences

Just like any proper pesticide, the product label will list the active ingredient(s) responsible for the toxic effect on pests. If the active ingredient on a product's label reads, "potassium salts of fatty acids," then it is an insecticidal soap — a pest control tool. Although potassium salts of fatty acids seems like a convoluted way to say insecticidal soap, it is an important detail. Fatty acids are naturally found in fats and oils from animals and plants. Soap is created by combining fats or oils with a lye and heating them, a process called saponification.

Insecticidal soaps are made through saponification with potassium hydroxide, a traditional lye. Most other soaps are produced using sodium hydroxide, a modern lye. While soaps produced by either process will kill soft-bodied insects, the sodium found in modern soaps can damage plant tissue, causing it to dry out.

Unlike insecticidal soaps, dish soaps are also typically not true soaps but powerful surfactants called detergents. These products are designed to strip grease and oily residue off surfaces.

The third group, castile soaps, are produced with vegetable oils, particularly olive, palm and coconut, and do not contain potassium salts of fatty acids. Although these products are often mistaken as safe pesticides, they are not registered as pesticides and do not meet the EPA's ingredient or labeling criteria to be used as a pest control tool.

## Common soap questions

*Is dish detergent a safe way to kill pests without harming beneficial organisms?* No. Detergents can kill many pests. However, they do not discriminate between harmful or helpful organisms. They also commonly

*Continued on Page 16*



Mole cricket soap flush is a monitoring tool. A mix of dish detergent and water flushes the pests out so they can be counted.



**Southern mole cricket**



*Soaps, continued from Page 14*

contain antimicrobial ingredients and can disrupt beneficial microorganisms, including beneficial insect-parasitic fungi.

*Is dish detergent harmful to plants?* Yes, it can be. The oil-stripping properties of detergents can disrupt the layer of wax on leaf and fruit surfaces. This waxy layer defends the plant against microbial, viral and fungal invasion and prevents water loss. Stripping off this layer causes plant foliage to dry out and can lead to severe damage or plant death.

### Rate and timing

Any soap can cause plant damage and harm beneficial insects if used incorrectly. Improper application rate causes many of the problems associated with using dish detergents and other soaps as pesticides. Properly registered insecticidal soaps usually recommend an application rate between 1–2 percent soap per volume of water to provide safe and effective pest control.

Not only does a registered product label provide consistent rate recommendations, but it also clearly states which species and cultivars of plants may be sensitive and should not be sprayed. For example, crown of thorns, fuchsia, bleeding heart, lilies, many ferns, and plants adapted to drought, low humidity, and strong sunlight, like succulents, are more susceptible to detergent damage.

In addition to specific plant species, those under stress from drought, excessive humidity, or temperatures over 90°F should never be treated with soaps. A helpful practice to reduce risk of plant damage is to always test the soap product on a few leaves or one plant before spraying them all.

Proper timing in terms of the target pest's life stage is also critical to effective pest control. Young, immature stages of plant pests will be much more effectively controlled with insecticidal soap applications.

### Suggested Uses

1. Insecticidal soap applications. Consider environmental conditions, plant health, and target-pest life stage. If conditions are appropriate, two applications five to seven days apart can control many soft-bodied pests. Importantly, insecticidal soap sprays must directly contact the pests to be effective because residues that remain on plants after drying have no insecticidal effect. Also, due to the mechanical nature of insecticidal soap toxicity, resistance is not a concern.



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2. Use detergent and water as a scouting tool for turfgrass insect pests. Some pests, such as mole crickets and caterpillars, hide deep in turf or soil and are difficult to detect. Drenching a small area of turf with 2 tablespoons of dish soap per gallon of water can cause these pests to come to the surface, where they can be identified and counted. Remember this is a monitoring tool used to determine pest presence, life stage, and abundance, not a pest control tool.



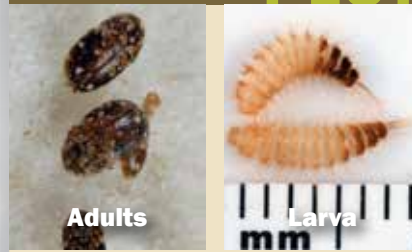
**Scale insects on tree branch**

3. Use soapy water and a soft brush to scrub scale insects off trunks and branches of infested plants (woody plant tissue). Scale insects are difficult to control and even more difficult to clean off of plant tissues. Although time consuming and only practical in small quantities, soapy water can remove dead scales that build up during severe infestations. The cleaner, less obstructed surface also helps future insecticide applications reach their target.

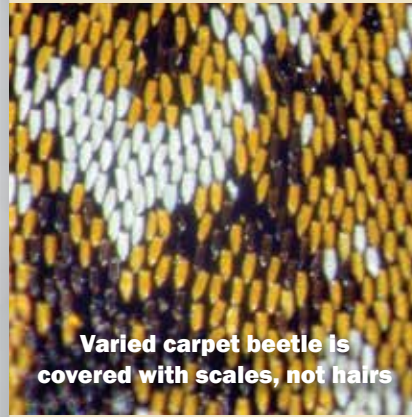
## Summary

Insecticidal soap products are chemically similar to other household soaps but are designed for pest control on plants. Dish detergents and castile soaps are not natural pesticides and are not appropriate for pest control in organic or conventional pest management. While other soaps may kill soft-bodied insects and mites, they are not as effective and can damage plants. Therefore, if the soap label does not specify uses on garden plants or as a pesticide then it should not be used as such. **PP**

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**T. anthrenoides**



**Varied carpet beetle is covered with scales, not hairs**



**T. anthrenoides beetle is covered with hairs**

*Photos above by Lyle J. Buss.*

*Shawron Weingarten*

## A Cabinet Beetle

*Trogoderma anthrenoides*

Lyle J. Buss

**I**N THE January/February issue of PestPro, I talked about the varied carpet beetle. This time I'd like to talk about another type of dermestid beetle, called *Trogoderma anthrenoides*. Unfortunately, it doesn't have a common name, although some *Trogoderma* species are called cabinet beetles. This is actually the species of dermestid beetle that I receive most often in the University of Florida Insect ID Lab.

Within the United States, this species is known only from Florida, Texas and Hawaii. All of my samples have come from Florida, from Gainesville south to the Florida Keys, except for a sample from Walton County in the Panhandle. It is also found in the West Indies and Central America.

Adults are 2.5 to 4 mm long and have a slightly more elongate shape than the oval varied carpet beetle. Their integument is nearly black with some patches of reddish brown and is covered with hairs that are black, orangish or white. Most evident are the small patches of white hairs scattered over the body. If you examine the beetles under some magnification, you'll see that the hairs are quite different than on the varied carpet beetle. Dermestids in the genus *Anthrenus*, such as the varied carpet beetle, are covered with wide, flat scales, similar to what you would see on a butterfly wing. *Trogoderma* beetles are covered with short, thickened hairs, as seen in the close up photos above.

The larvae are elongate and covered with long hairs. They are usually found rather close to the food source. Adults can fly, so they may be found far away from the infested food.

It is interesting that most of my samples of this cabinet beetle arrive with no host information, meaning that people find them crawling around in their home but don't know where exactly they are coming from. In the few cases where my clients have found the source, the infested products have included dog food, dog treats, clumps of pet hair, rodent bait, corn meal, and a no-bake crust mix. According to the literature, it has been found as a pest in insect collections, dried herbs, and cereal products. Outdoors it has been found in nests of mud dauber wasps, where it feeds on dead insects.

If you run across this species, you can help me out by letting me know what kind of items you find them infesting! **PP**

*Lyle J. Buss, Scientific Photographer, manages the Insect Identification Lab at the UF/IFAS Entomology and Nematology Department.*