

Insecticidal Soap Does Work When...

By Charlie Mosse, May 2021

Insect season started over a month ago or so. Scale, and mites are the most problematic, while aphids mealybugs, leaf miners and white flies get a mention for some plant varieties. Juniper scale is becoming more of an issue these days. They can be easily missed at initial infestation, rapidly spread and then difficult to control. The applies to mites.

So, what can be used? As regulations advance, our choices have greatly diminished. There are no silver bullets that will eradicate juniper scale or mites that have minimal toxicity and/or do not persist on the plant or in the soil. However, there is one insecticide that is fairly all-purpose and safe to use for scale and other common insects we see on most bonsai species: Insecticidal soap. When soaps are properly applied, they can be highly effective. Soaps get negative reviews at times which is usually due to improper application, improper timing or too high an expectation for an insecticide that does not have a residual effect, that is, they are not persistent on the plant.

Insecticidal soaps are very safe for us to handle. Ingredients: potassium salts of fatty acids --- soap. True soaps have minimal negative effects on plant tissues whereas detergents are much stronger and have other chemicals in them that make them more effective for heavier cleaning jobs making detergents more phytotoxic to plants. Detergents can and do cause foliar burns and also burn non-hardened soft twigs. When a chemical or solution of chemicals cause harm to plants, they are said to be **phytotoxic**. This term is used commonly and it is good to be aware of it. Commercially available insecticidal soaps contain no detergents or other chemicals that are harmful to plants and when properly applied will rarely cause phytotoxic symptoms.

Caution: Many people like to make their own solutions. When we make our own mixtures, be careful to read the label to assure you are buying soap and that you test your home remedy before spraying on many plants. Some recipes include adding horticultural oil for helping to spread the solution better and to aid in suffocation of the target insect. Vinegar is added to adjust the pH down since most insecticidal soaps are basic. There are recipes out there but be sure to test the solution before generally applying. Buyer beware.

The cautions for insecticidal soaps are similar to other insecticides, but there is more latitude with the soaps:

- Spray at a time when the drying of the foliage will be slow. The longer the solution can stay wet on the insect and the leaf, the better the effect.
- Avoid hot days to avoid phytotoxic effects on the plant, but one can spray on warmer days than with petroleum based insecticides. 90 degrees is the max temp for most soaps. Read the label.
- Avoid dry days (Santa Ana type humidity levels). Increased risk of burning and solution dries too fast for maximum effect.
- Water plants the day before to assure good hydration.
- Avoid very soft/young foliage when possible. Sometimes this is not possible so it is suggested to move the plant to the shade for the day if the leaves are very soft or there are other concerns.
- Hosing off the foliage the morning before application to remove some of the bugs, eggs, spores etc., is a good practice.

- Insecticidal soaps can kill beneficial insects but generally much less so than more toxic and persistent chemical insecticides.
- Soaps are best applied with tank sprayers or hand-held pressure sprayers are the best way to apply soaps. Trigger sprayers are OK for small applications. Hose end sprayers are OK but are not as accurate for controlling the concentration.

Scale insects spread by what are called scale crawlers. Eggs hatch inside of the scale. Eventually many very tiny crawlers emerge and start moving around in search of a new spot to set down. The crawlers are soft bodied and very susceptible to control at this time. If you want a challenge, use a magnifier and starting in about mid-March, check your foliage daily for tiny, mobile crawlers. Crawler emergence timing is changing due to more mild temps so expect them earlier, approximately March/April through May in cool years, and June in colder areas. But that can change with the weather that year. So, if you can see the scales on the foliage from the previous year, then crawlers will be emerging the current spring. Once the scale produces its “house”, control becomes difficult. This when one may have to switch to systemics. The soaps can be applied in the spring to control the crawlers but must be applied several times, always per label instructions.

After discussing insecticidal soaps with some bonsai members, I searched for a good reference article on insecticidal soaps. I did find many articles, but the article link listed below was found to be fairly comprehensive and easy to read. Definitely worth the read.

<https://laidbackgardener.blog/2017/01/22/so-what-is-insecticidal-soap-exactly/>

The most important information in the article is quoted as follows:

“Insecticidal soap acts by contact. It is effective only when it is wet and has no residual effect. In other words, it loses all utility once it dries out. Therefore, you can’t use it to prevent insects and mites, it must touch and coat living pests to be effective.”

Soap kills insects in several ways:

- *It penetrates the arthropod’s cuticle then damages cell membranes, causing the contents of the cell to leak out, leading to dehydration.*
- *It melts the protective wax that covers certain insects (mealybugs, scale insects, certain aphids, etc.) and this leads to dehydration from evaporation.*
- *It blocks the pores through which insects breathe, leading to asphyxiation.*

The pest treated usually dies very rapidly, within minutes of treatment.”

Insecticidal soap is strictly a contact insecticide. So complete coverage of the leaves, stems....all of the nooks and crannies of a plant....must be wetted so that the insect body gets effectively wetted. You will find this particularly important when treating the tiny juniper scale hidden down inside of the overlapping leaves of a juniper. This is true of all contact insecticides that have little or no residual effect on the target insects. Applying the solution with enough pressure and volume is especially important to ensure effective control.

Insecticidal soaps are like any other pesticide. One must read the label before buying to be sure the target insect will be controlled and then of course for proper application instructions before applying.

If soaps do not control the scale or other target insects, then other insecticides may be needed such as a systemic. Horticultural oils can be used but not during warm weather or when foliage is still, maturing, not hardened off. Ask around, particularly our club instructors, to find out how they and others control this scale or other insects. There are other options.

Images of Juniper scale. I copied these photos so that those unfamiliar with this insect can keep an eye out for it. It starts out very sneaky and is not always readily visible. When it does become readily visible then one may have a significant infestation.

The left photo shows a very light infestation on scale foliage. Easy to see but can be overlooked if the scale is on the underside of the foliage. The right photo readily shows an infestation that is spreading fast at this point. The infestation would be easily seen from a distance.



The next two photos show needle foliage and scale foliage side by side and then just needle foliage. The scale can hide much deeper down inside the leaf axils (point of attachment of the leaf to the stem) of the needle type foliage than on the scale type foliage where they are seen more readily on the surface of the leaves, as in the photo above. If the infestation is moderate or worse as in the first photo, the scale is readily seen. A light infestation is not readily eye-catching even on scale leaves and almost not detectable on needle foliage unless one takes a close look. Keep a keen eye out for it as the scale can multiply very quickly and catch one off guard.



In the left photo the infestation is barely detectable. A magnifier will be helpful to spot this in the early stages. A magnifier is a good tool to have in your bag for juniper scale and also for spider mites. Spider mites can be detected by knocking them from the plant onto a light colored surface, preferably a sheet of white notebook paper. But with a magnifier one can better get a feel for the degree of infestation. In the right photo, the scale infestation is starting to spread rapidly. Many small scales are easily seen. The infestation does not look too bad from here as yet, but upon peering into the tiny recesses of the leaf axils, one would see hundreds more. So, this infestation is actually moderate and spreading rapidly.

So, as the climate gets milder our bug seasons are starting sooner and lasting longer. A dormant spray will help with overwintering insects, but if that is not done, then keeping an eye out earlier in the spring, even late winter, is necessary. When one does find an infestation, then the key is applying the insecticidal soap with excellent coverage so there is a better chance of the insects being covered with the soap. The insecticidal soaps are a good control for the scale (crawlers) and also for spider mites. Re-application will be necessary since soaps are contact only insecticides.

Another change in our weather that we see more frequently is the recurring off-shore winds/air circulation, aka Santa Ana's in the winter and spring. This brings in warm, dry air to the delight of spider mites. Santa Ana type events usually occur in late summer and fall and are more problematic at those times. When we get these events that last more than a few days, then a mite "explosion" could likely occur. It does not take that many mites to create a big problem and initially they are hard to see and the damage is minimal. Before foliar yellowing or death occurs, the foliage will remain green but become very dull looking. There are no good images of this "dulling" online. Ask around for help or pose the question with photos on the SDBC Facebook site if you think you have a problem. Many forums also discuss mites at length.

Proactive measures can be and should be taken before unseasonal warm periods, during extended warm periods like summer, and full blown Santa Ana events. Some common proactive measures are:

- Check for mites using the light colored paper test. Hold under the branches, shake the branch a bit and see what falls onto the paper. If the spots move and/or leave a streak when squished.....most likely mites are present.
- Spraying with soaps a couple of days before these warm dry events.
- Wash off their plants with a strong spray before, during and after these events.

- Wait and see what develops and spray insecticide or water as needed.
- Spray after the heat subsides in anticipation of a mite outbreak. Mite outbreaks are common after heat events.

Regardless, if an outbreak occurs, then repeated sprayings will be needed to control the mites. A continuous hatching occurs because all of the eggs do not hatch at the same time. This applies to scale and most insect infestations.

Good, short article on Juniper scale: <https://entomology.ca.uky.edu/ef429>

Excellent write up by Brent Walston of Evergreen Gardenworks, a bonsai and pre-bonsai grower in California: <https://www.evergreengardenworks.com/mites.htm>

Good article on spider mites: <https://www.planetnatural.com/pest-problem-solver/houseplant-pests/spider-mite-control/>