

Pest Control Decision Making  
and  
Managing Scale Insects  
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Fall is on its way and colder weather is soon to follow. As we move into the windy, blustery months of early winter, it is easy to forget pest problems and focus on other matters. But we need to remind ourselves that just because winter is approaching, insect pests do not disappear entirely. And will definitely be back in the spring.

Scale insects are one significant group of insect pests that can be challenging for us. Here are a few basic facts to dispel misinformation about scales so that we can be effective in field diagnosis and pest management decision making.

Scale insects are divided into two major groups, the soft scales and the armored scales. Examples of soft scales would include cottony maple, European fruit lecanium, magnolia, pine tortoise, and tuliptree scales. Common armored scales include pine needle, euonymus, San Jose, oystershell, and obscure scales, just to name a few. Generally scale populations do not build up rapidly like aphids or mites but, given enough time and under favorable conditions, scales can reach levels that will cause branch and tip dieback, slow plant growth rates, cause a yellowing or chlorotic appearance to the leaves, and contribute to premature leaf drop. This can result in extended time in field production and reduced marketability of the plant.

Diversity is the name of the game with insects and scales are no exception. In fact, to the untrained eye, they may look nothing like a "typical insect". Some will look like small "bumps" on branches of woody plants whereas other scales will resemble a lenticel or part of the bark. Over the years, I have seen scale populations overlooked because the scales were so heavy that the examiner thought they were part of the bark or a unique characteristic of the plant. This can contribute to plant stress making it more susceptible to lethal insects and pathogens.

Let's take a closer look at scales and review some of their unique characteristics and habits. All scales have incomplete or gradual development meaning they have an egg stage followed by a nymph or "crawler", and finally an adult. The "crawler" is mobile, lacks the protective waxy covering of adult scales, and tends to travel about the host plant. The crawler stage is the life stage that we tend to target for pest control. However, to be effective, you must carefully monitor for crawlers and make sure they are present before you apply a chemical pesticide. Spraying while eggs are still present or waiting too long can result in wasted effort and frustration. Depending on the scale species, they may be in the crawler stage only a few days up to maybe a week. Weather and microhabitat conditions greatly influence scale development. Scales on the north side of a building in the shade will develop at a much slower rate than scales living on a plant situated in direct sun with a light colored surface behind them where reflected heat may result. Once the crawler has settled down it loses its legs and antennae, becomes sessile, and is highly resistant to contact chemical pesticides.

As mentioned above, scales can be divided into two major groups, the soft and the armored scales. These two groups have important differences. Soft scales generally have only one generation per year, do produce large quantities of honeydew (a by-product of sap-feeding insects), overwinter as immature fertilized females, and have crawlers that are fairly mobile compared to their armored scale cousins. The soft scale crawlers are generally out in early

summer (June in the Midwest). In comparison, armored scales generally have two or more generations per year, do not produce honeydew, typically overwinter in the egg stage under the female's body, and have crawlers that are comparatively less mobile. First generation armored scale crawlers show up in May (Midwest) with a second generation appearing in August (Midwest). Additional helpful information when looking for scales include knowing common hosts for a particular scale species. Some scales are quite host specific or feed on only a few plant species like euonymus scale on euonymus and magnolia scale on magnolia. Other scales are less fussy such as oystershell scale which is found on many different species of woody plants and shrubs. In addition to knowing the scales common host plants, knowing what portions of the plant the scale tends to prefer can also be helpful in pest identification and monitoring. For example, oystershell scale is commonly found on the woody parts of the plant (i.e. bark, twigs, branches) while pine needle scale is found only on the needles. Some scales are not so particular such as euonymus scale which occurs on both the leaves and woody plant parts. Cottony maple scale is similar but, even more active as the immature females overwinter on the twigs and branches while the crawlers migrate to the maple leaves to feed during the summer. As fall approaches, they once again return to the twigs and branches to overwinter.

Scale populations will not explode on you but, once heavy populations are present, infested plants may be restricted from sale and prohibited from entering the trade depending on regulations. If you find yourself in this situation, you have several options to choose from. First, make sure you properly identify the scale. Start with plant(s) involved and determine if they are possible host plants. Make notes on where the scale is located on the plant and then begin the identification process including the overall appearance of the scale, number of generations per year, overwintering stage, and any natural controls (i.e. parasitoids, predators).

If you decide to go with a "crawler spray", make sure crawlers are present. It is ineffective and a waste of time to spray otherwise. Remember, if you choose a "crawler spray", you do run the risk of killing beneficial insects associated with the scale. In general, nonpest insects are more susceptible to conventional pesticides (i.e. carbamates, pyrethroids, organophosphates). Eliminating beneficials can result in scale populations with no natural controls and the opportunity for these populations to grow basically unchecked. Using "softer pesticides" such as horticultural oils, soaps, and botanicals (i.e. neem) can be equally effective in killing crawlers but, are much less toxic and harmful to beneficials and the applicator. Scale infestations will rarely kill a plant by themselves but, can weaken the plant to the point where lethal pathogens and insects can gain a foothold resulting in plant death. Be sure you look at the "big picture" before you grab the sprayer.

The use of horticultural oil sprays during the dormant season on overwintering stages (i.e. eggs, immature females) can be quite effective. Studies have shown dormant applications of oil to be very effective against certain overwintering armored and soft scales. Dormant applications provide the added advantage of greatly reduced impact on beneficials, reduced applicator exposure, and a much larger application "window" compared to "crawler sprays".

In closing, keep in mind that scales can be effectively managed if you do proper pest identification, know the pest's host plants, where the pest is most likely to be found on the plant, and potential natural control agents. Using this information in combination with proper pest management decision making can give you the needed flexibility to effectively manage scales with minimal impact on your plants and the environment.

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