UNIVERSITY OF WYOMING

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Scales and Mealybugs
***Order*:**
Homoptera (aphids, scales, whiteflies, leaf hoppers, and mealybugs)
***Family*:**
Coccidae (soft scales), Asterolecaniidae (pit scales), Eriococcidae, Psuedococcidae (mealybugs), and Diaspidae (armored scales)
***Metamorphosis*:**
Simple (egg-nymph-adult)
***Mouthparts*:**
Piercing-sucking

Scales and Mealybugs

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These insects suck plant sap through specialized piercing-sucking mouthparts. Protected by a waxy covering, scales may infest many trees and indoor plants. Often, scale insects are not recognized as insects, but may be misdiagnosed as scabs, wounds, or plant blemishes. Related to the immobile scale insects, mealybugs have similar life histories and are controlled similarly. Mealybugs are common greenhouse pests but are uncommon outside, in Wyoming. Pruning and maintaining plant vigor are often sufficient measures for controlling scale insects and mealybugs, but—if necessary—crawlers (the first nymphal form after hatching) can be treated with insecticides to reduce infestations.

Figure 1. Pine needle scale.

Body Form

Egg: Eggs of scales are laid under the waxy covering of the immobile female. The armored scales usually overwinter as eggs; other scale insects overwinter as nymphs. Mealybug eggs are laid together in a loose "cottony" sack attached to the host plant.

Nymph: Nymphs are variously colored, generally flattened, and oval or pear-shaped. The crawler, the first form after hatching, is very small and, unlike other stages, the crawler is mobile. After finding a suitable feeding site, the crawlers molt to the next instar, become permanently attached to the plant, and develop a waxy covering over their bodies. Mealybug nymphs are free living, but are also generally immobile. They are oval-elongate and covered with a thick, white, waxy secretion.

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Adult: Female scale insects are immobile, wingless, and legless. They are flattened with indistinct segmentation. Scales are small, usually less than 1/5 inch long. Under their wax scales, they remain attached to the host plant, mating, feeding and laying eggs in one place.

Males are typically gnat-like in appearance, having well-developed legs and wings, by which they search for females. Male scale insects have only one pair of functional wings, and in some species are wingless. Males are rarely noticed, and in certain local species there are no males, as in pine needle scale and oystershell scale.

Mealybugs are mobile, with the females having well-developed legs. Mealybugs are up to 1/4 inch long; they are covered by a thick, ridged layer of wax, often with lateral filaments of white wax fanning out from the body.

Life History

Female scales die after laying their eggs. Depending on the species of scale insect, the winter may be spent as eggs or as nymphs. Shortly after initiation of new growth in the plant (bud break), the eggs hatch, and the crawlers become active, moving out to find new feeding sites. They feed on the same plant or may be blown to new host plants on the wind. This stage is the insect's most vulnerable period to chemical control. After settling on the host plant, the nymphs feed and molt to the next instar, producing the protective wax covering over their bodies. Depending on the climate and species of scale, there may be more than one generation per summer.

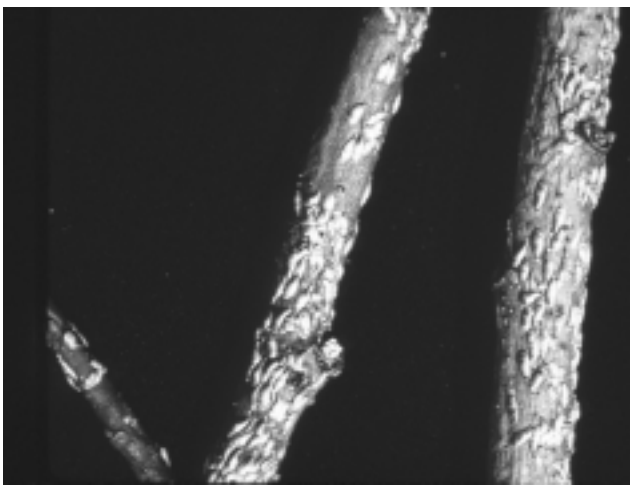

Figure 2. Oystershell scale.

The life history of mealybugs is generally the same as scales. After hatching, the nymphs crawl to new feeding sites. As the nymphs grow, the wax covering their bodies becomes thicker, rendering them more resistant to insecticides. Unlike scales, female mealybugs may produce egg sacks throughout the growing season and may be found in all stages indoors throughout the year.

Plant Injury

Loss of plant vigor and yellowing of foliage are typical of heavy infestations. Twig die-back or premature loss of leaves may also occur. Repeated infestation year after year may cause plants to become less able to withstand other pests and severe weather. Similarly, plants in poor health due to poor maintenance or severe weather (such as hot, dry conditions) may be more prone to scale and mealybug infestations. Under light to moderate infestation, scale insects may be unnoticed and will not cause adverse plant

health. Under heavy infestations, however, they may cause yellowing and obvious injury. In some cases, the appearance of the scales themselves may be cause for concern, and, in some species, the old scales remain on the plant.

The excrement of scale insects (except armored scales), is a sugary liquid known as honeydew. These insects are not as prolific honeydew producers as aphids, but sooty mold may grow on the honeydew. In some cases, the honeydew produced by scales or aphids can drip onto cars, patios, and sidewalks, creating a nuisance.

Management

In most cases healthy plants are able to withstand some infestation by scales or mealybugs without loss of fitness. Natural enemies of scales, such as tiny parasitic wasps, often prevent outbreaks of these insects from occurring.

The visible presence of these pests can be removed if practical, by pruning the infested plant parts. Early detection of scale or mealybug presence is necessary for pruning to be practical.

The waxy covering is quite resistant to insecticidal penetration, therefore standard insecticide sprays will not be very effective in controlling scales during much of the growing season. This is also largely true for mealybug control.

Dormant oil sprays applied before bud break can smother scales and mealybugs. After growth begins in the spring, horticultural oils are effective in killing the young, relatively unprotected, nymphs. These oils may be toxic to some plants, causing discoloration or burning of foliage, so this method should be used with caution. Prior to using horticultural oils extensively, apply the oil to a small, inconspicuous branch and after 48 hours check this branch for adverse reactions.

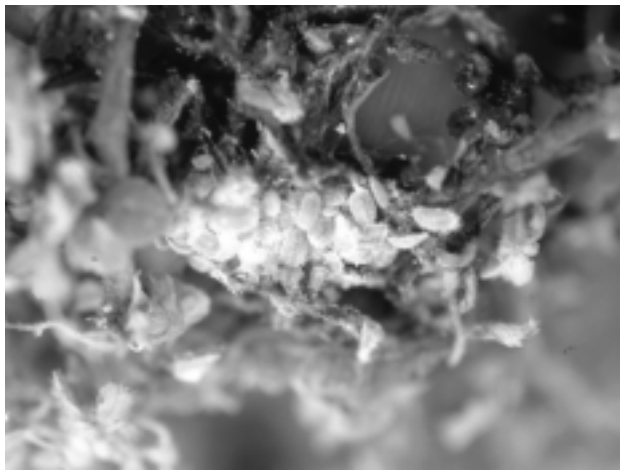

Figure 3. Mealybugs.

Spring applications of horticultural oils, insecticidal soaps, and other insecticides should be timed to coincide with the appearance of the crawlers, when the insect is most vulnerable, though these products do have some toxic activity after this instar. Plants should be examined for the crawlers beginning at new plant growth (bud break). Scales tend to be found on tender, new stems and on leaves and leaf petioles, although old scales from previous infestations may be found on older plant parts. Mealybugs usually feed on newer growth also, but can often be found anywhere on the plant except the roots. Several applications may be necessary to eliminate scales from infested

plants. Horticultural oils and insecticidal soaps have contact activity with no residual and little hazard to non-target organisms. Some plants may be susceptible to injury by oils and insecticides; use the procedure noted above to test whether they are toxic to the plant. Insecticidal soaps are generally less likely than oils to cause harmful plant responses, and soaps specifically designed for treating insect pests are less likely to cause burning than home-made soap preparations.

Mealybug egg sacks are quite obvious. Hand picking the egg sacks in the fall, or spraying them with a hard jet of water containing a wetting agent, such as a small amount of insecticidal soap, will reduce spring infestations. For use in the greenhouse, some species of natural enemies of scales and mealybugs are available commercially.

Sources of further information

Insects that Feed on Colorado Trees and Shrubs (PSIS-4) and *Management Recommendations for Insect Pests of Trees and Shrubs* (PSIS-5), are available from the University of Wyoming Bulletin Room, Merica Hall, (phone 307-766-2115). Other guides on horticultural pests and their control, including scale insects and mealybugs, are available from various sources. University of Wyoming or Wyoming Department of Agriculture representatives may help locate literature.

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