Scale

Oystershell scale, *Lepidosaphes ulmi*; San Jose scale, *Quadraspidiotus perniciosus*; European fruit lecanium, *Parthenolecanium corni*; Irregular pine scale, *Toumeyella pinicola*; and others.

Host/site

Scale insects, a huge and diverse population worldwide, can infest numerous different woody plants: trees and shrubs, including fruit trees, conifers, and rhododendrons and azaleas. Scales may occur on twigs, leaves, branches, or fruit. Scale damage can also commonly occur on interior plants such as *Ficus benjamina,* and can become a persistent nuisance indoors by spreading to multiple plants. When present in large numbers, scale damages plants by sucking juices from the vascular system. Plants weakened by other environmental stresses such as drought or disease will suffer more from scale attacks.

Top: lecanium scale; Bottom: oystershell scale. Photos courtesy of WSU Cooperative Extension.

Identification/Appearance

"Scale" describes many individually different insects, but their appearance and the resulting plant damage have common features. Adult scale lives underneath a protective covering, which appears as raised bumps that may be shaped as ovals or modified ovals (oystershell scale, euonymus scale), circles (European fruit lecanium scale, male San Jose scale), or white masses (cottony camellia scale and mealybugs on houseplants.) The covering, composed of waxy filaments and insect feces, repels predators and protects the female and her eggs. Male scale coverings may be different in shape from the female. Specific scale species are identified by the shape and color of the covering. Scale insects, when hidden by their coverings, can be sufficiently odd-looking that they are not recognized as insect pests.

Life Cycle

All scale insects have three distinct life stages: egg, immature, and adult. Eggs grow beneath the scale covering and often overwinter in this stage. Some species will overwinter as immature nymphs, becoming adults as weather warms. The egg stage hatches into six-legged crawlers which move to new growth on plants and begin feeding by inserting sucking mouthparts. As they grow, females often remain in one place, while males may have a brief winged phase (often unseen).

Natural Enemies

Like aphids, which are also sucking insects, scale provides a food source. Beneficial insects, including parasitic wasps, ladybird beetles, and lacewings, often can reduce scale infestations to acceptable levels by eating the vulnerable crawlers and the eggs. Parasitic wasps may pierce the scale and lay eggs within. A landmark moment in integrated pest management was the first successful use of beneficial insects to control plant pests: the introduction of the Australian lady beetle (*Vedalia* sp.) to control cottonycushion scale on citrus plantings. Birds may also provide some level of control.

Some scale populations, being sucking insects like aphids, release a sticky substance called "honeydew." Honeydew, particularly that caused by brown soft scales, may attract scale-associated black ants that will attack beneficial insects that prey on scale. Controlling these ants (see physical/mechanical controls section below) will help to increase the effectiveness of the beneficials.

Monitoring

Scale outbreaks often become obvious only when numbers have built up. Check bark and twigs of susceptible plants, particularly during winter when observation is easier. Also monitor leaves. On many plants including camellia, azalea, holly, and yew, scale can cause foliage to become off color and stunted. Honeydew secreted by some scale causes the secondary problem of black sooty mold, resembling oily black deposits on leaves. (Check camellias for this since cottony camellia scale produces copious honeydew.) Use a magnifying glass in mid and late spring to monitor for crawler emergence. Magnification is also useful to check the scale for rounded holes indicating wasp inhabitants, an indication of natural control.

(continued/over)

GREEN GARDENING PROGRAM

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Action Threshold

Some scale infestations can be kept in check by natural predators, with no treatment necessary. If the plant shows color changes, weakened foliage, a large infestation, or the general failure of health, treatment may be necessary. Fruit trees such as apple and citrus can experience crop failure or unsalable fruit. Interior houseplant infestations should be dealt with when first observed.

It's also vital to identify the specific plant and type of scale because that will help in determining if action is necessary. Knowing the insect's life cycle and determining when the vulnerable stage emerges will be crucial to controlling scale infestations. "Armored" scales and those hidden under protective coverings are not susceptible to attack by predators or by chemical intervention such as pesticides.

Physical/Mechanical Controls

Limited scale infestations may be scraped or scrubbed off whenever they are visible. Often this is most convenient when branches are bare and it is easier to see them. In some areas, washing dust off ornamentals during summer will help to encourage parasitoids. Growing flowering plants near scale-infested plants also helps, particularly those plants that attract and feed lady beetles. If large numbers of ants are climbing up tree trucks, apply a sticky material such as Tanglefoot; wrap tree trunks first to prevent bark injury.

Biological Controls

Natural enemies are important contributors to control of scale, and many different parasitic wasps, such as *Encarsia*, can be purchased commercially for control. For best use of biological controls, identify the host and the scale type. Smaller infestations of scale can often be controlled by beneficials.

Chemical Controls

Identify the host and pest. Large infestations, particularly where there is an economically valuable crop such as apples, may justify chemical treatment. However, chemical treatment is often not necessary for apple trees in landscape use. Avoid random applications of broad-spectrum insecticides which can harm beneficial predators. Certain scales, such as San Jose scale, lecanium scale, hemlock scale, and cottony camellia scale, are susceptible to dormant applications of horticultural oil during late winter or early spring. These work by denying oxygen to the over-wintering stages.

If insecticides are chosen, timing is critical. Scale insects are most vulnerable when crawlers are present because the newly hatched insects have no protection. Insecticidal soap is the least-toxic material registered for crawler control on many scales, including juniper scale, pine needle scale, San Jose scale, spruce bud scale, brown soft scale, cottony camellia scale, and hemlock scale.

Organophosphate insecticides including acephate (Orthene) and malathion are registered for crawler control and are most likely to be considered necessary on large infestations of oystershell scale. These are broad-spectrum insecticides whose application may kill beneficial insects.

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