

Home Grounds Fact Sheet

Scale Insects

Scales show little resemblance to the usual insects. Except for the males of some species, adult scales are permanently affixed to plants in a position selected during the crawler stage. For this reason, scales are likely to be overlooked until the infested plant is completely encrusted or the twig or plant part has died. The mouth of the scale (a needle-like tube) is inserted into the plant to obtain food. Large amounts of sap are withdrawn. These insects excrete a clear, sticky substance called honeydew, upon which a fungus, sooty mold, may develop. Cars or furniture under a tree heavily infested with scales may be spotted or covered by falling droplets of honeydew.

Scales are well protected because they live under a waxy, almost impermeable, shell. Their eggs are also deposited under the shell or in a cottony mass, protecting them during this stage of development. Tiny, mobile crawlers hatch from the eggs and may be mistaken for mites. They crawl about during this period of development and are easily killed by insecticides.

Adult scale insects are usually small but vary in size, shape and color - some as small as a pin head, others as large as a pea. Some are white, others are various shades of brown, and some are camouflaged to blend into their environment.

Horticultural oil applied during the dormant season or as a verdant treatment is a control common to all scales. Timing differs for different species. Common scales and controls are discussed below. Temperatures must be above 40°F. during a dormant spray to avoid plant damage, so spray on a warm, sunny morning. Summer sprays should not be applied in temperatures above 80°F. Spray on a cool evening. Never spray during windy conditions.

For complete information about horticultural oil, see Home Grounds Fact Sheet D-1-10.

Integrated Pest Management (IPM) Considerations

IPM is a common sense approach to pest control and plant care. It employs a number of measures to prevent, control or reduce plant problems. These include using resistant plant varieties, proper plant selection and placement, good aftercare and biological and/or mechanical controls. As a last resort, after all other remedies have been explored, a pesticide* that is least toxic to people and natural predators, can be considered. Prior to using any pesticides, plants should always be monitored for the degree of infestation and a sensible control measure considered.

* A pesticide is a substance that kills, or attempts to kill, a particular pest, e.g. **insecticide**, **fungicide**, **herbicide**, etc.

COMMON SCALES ON TREES AND SHRUBS

San Jose Scale

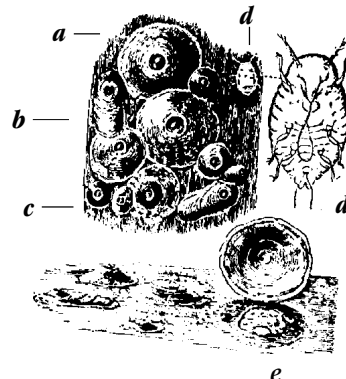
San Jose Scale (*Quadraspidiotus perniciosus*) was brought to the United States on a shipment of plant material from the Orient. Well over 60 kinds of fruit and ornamental trees are infested by San Jose scale, especially pyracantha, cotoneaster, boxwood, dogwood, hawthorn, privet, walnut, linden, rose, elm, honey locust, beech, willow, lilac, spirea and pachysandra. Infested plants exhibit overall stress, with dead twigs and branches.

Partially grown males and females overwinter and mature in the spring. Females produce living young. Feeding and development proceed rapidly, resulting in as many as five overlapping generations in a season.

San Jose scale is whitish-to-tan, 2 mm in diameter with a central nipple. The greenish host tissue of shoots and leaves around the scale often turns red. On twigs and small branches, the red color extends deeply into the inner bark to the xylem, but the color is not visible at the surface of thick bark.

Control

- A sex pheromone trap is available for trapping males.
- When the host species is dormant, a horticultural oil can be used at the dormant rate.
- From early May through early September, use horticultural oil at the summer rate. **(see note A.)**



a Adult female scale
b male scale
c young scales
d larva just hatched
d' same highly magnified
e scale removed showing body of female beneath

COMMON SCALES ON TREES AND SHRUBS

Oyster Shell Scale

Oyster Shell Scale (*Lepidosaphes ulmi*) The hard scale covering resembles a miniature brownish-gray oyster shell, sometimes with concentric bands. Their bodies are broadly rounded at one end and about 1/8" long. It is found on twigs of lilac, ash, red bud, dogwood, poplar, willow, horse chestnut, elm, beech, walnut, cotoneaster, apple, birch, sycamore and others, including pachysandra.

Stages of the Oystershell Scale

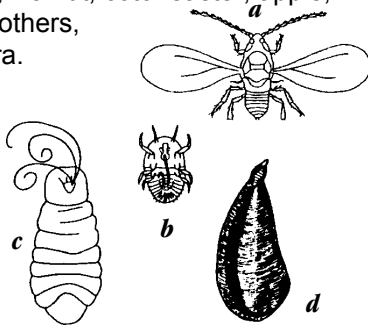
(all greatly enlarged)

a adult male

b newly hatched young or crawler

c adult female

d scale of female



Control

- If scale infestations are small, prune out affected plant parts.
- Dormant sprays are the most effective control measure. Apply horticultural oil in late March to April before buds open at 7-91 GDD.
- Summer sprays - (**see note A.**) Apply between 363-707 GDD or when ruby horsechestnut and beauty bush, *Kolkwitzia amabilis*, bloom.
- Several sprays may be required. The best control is obtained by applying both the dormant spray and a summer spray.

For further information about oyster shell scale, see Home Grounds Fact Sheet E-1-23.

Golden Oak Scale

Golden Oak Scale (*Asterolecanium variolosum*) infests white and black oaks. Males are rare. The female is 1 to 2 mm in diameter, green, golden or brown, and usually found in a depression on the twig. After overwintering in a mature state on the twigs, females produce living young (crawlers) during the spring and summer, for as long as 5 months. Crawlers do not move far from the parent and tend to colonize current-season and 1-year-old wood.

Poor growth and twig dieback is caused by removal of plant fluids and possibly by the injection of toxins into them. Affected twigs retain dead leaves throughout the winter. A severe infestation can delay the leafing out of oaks in the spring by as much as 3 weeks. Use binoculars to examine the upper branches. This tiny pest is often the over-

looked killer of mature trees. The golden oak scale is often associated with anthracnose, a fungal disease of oak.

(See Home Grounds Fact Sheet E-2-1, Anthracnose.)

Control

- Little is known about natural controls of this scale. A parasite (*Habrolepis dalmanni*) attacks 2 of the 3 species, but reduces the populations only very slightly.
- Apply horticultural oil at the dormant rate (2-4%) between 7 and 121 GDD when boxelder blooms in late March to April.
- Apply horticultural oil at the summer rate (1-2%) from 802-1266 GDD when *Rhododendron maximum* and *Clematis jackmanii* bloom. (**see note A.**)

Azalea Bark Scale

Azalea bark scale (*Eriococcus azaleae*) feeds on the bark of twigs and stems, causing an unthrifty appearance and dead twigs. It tends to settle in branch crotches. Azalea bark scale is closely related to - and often confused with - mealybug.

The female scale is dark purple and covered with a white, waxy sac. A mature female measures about 3 mm in length, including her egg sac. Males are similar in appearance but are less than half the size. One generation is produced annually. Overwintering scales mature in the spring and lay eggs that hatch in early summer.

In addition to azalea, this scale can be found on rhododendron, andromeda, hawthorn, poplar and willow.

Control

- The parasitic chalcid wasp, *Coccophagus immaculatus*, reduces populations.
- Apply horticultural oil during the dormant period (late March to April.)
- Apply horticultural oil at the summer rate in late June to late July when *Rhododendron maximum* and *Philadelphus* bloom. (**see note A.**)

COMMON SCALES ON TREES AND SHRUBS

Cottony Maple Scale

Cottony Maple Scale (*Pulvinaria innumerabilis*) is one of the largest and most conspicuous of the scale insects. It damages host trees by withdrawing sap. Heavy populations cause the dieback of twigs and branches and premature loss of foliage. Cottony maple scale produces a large quantity of honeydew that supports the growth of sooty mold fungi. Sooty mold blackens leaves, twigs and anything under the tree.

This scale feeds on maple, oak, dogwood, beech, euonymus, sycamore, willow, linden, elm, fruit trees, rose, lilac, Virginia creeper and others.

Cottony maple scale overwinters on twigs as an immature flat female that grows rapidly in spring. By late spring, she produces the white, cottony egg sac (that contains up to 1,000 eggs) while still attached to the twig. In late June and July, tiny crawlers migrate to the undersides of the leaves, where they insert their mouth parts in or near veins. They spend the summer on either surface of the leaves. Tiny, winged male scales appear in late summer, mate with immature females and die in a day or two. Before the leaves begin dropping in the fall, the females migrate back to the twigs and attach them-

selves for overwintering. One generation is produced a year.

Do not confuse this scale with the cottony maple leaf scale, *Pulvinaria acericola*, that lays its egg sacs on the underside of the leaves rather than on the twigs. Hosts include maple, hollies, andromeda, honeysuckle and tupelo (*Nyssa sylvatica*).

Control

A number of natural enemies are important in regulating populations. Many wasp and fly parasites and various lady beetles attack immature scale. The English sparrow is believed to be an important predator of fully grown females. For severe infestations, one of the following sprays may be needed:

- Apply horticultural oil during the dormant period in early spring.
- Apply horticultural oil at the summer rate between 802-1265 GDD when *Philadelphus* and *Tilia cordata* (little leaf linden) bloom. **(see note A.)**
- Do not use acephate on fruit trees.

Cottony Taxus Scale

Cottony Taxus Scale (*Pulvinaria floccifera*) These small, tan, egg-shaped scales are often overlooked on the twigs or undersides of yew needles or the leaves of holly, rhododendron, hydrangea, euonymus and English ivy. Only after the female has migrated to the underside of a leaf and laid more than 1,000 eggs in a white fluffy egg sac is this scale noticed by most home gardeners. After she lays her eggs, she dies and her body dries up and falls away, leaving only the white egg sac attached to the leaf. The eggs begin to hatch in June. The life cycle is similar to

cottony maple scale.

Control

- The tiny parasitic wasp, *Coccophagus lycimnia*, reduces populations slightly.
- Apply horticultural oil at the dormant rate between 7-91 GDD.
- Apply horticultural oil at the summer rate between 802-1388 GDD when *Philadelphus* and *Clematis jackmanii* bloom. **(see note A.)**

COMMON SCALES ON TREES AND SHRUBS

Elongate Hemlock Scale

Elongate Hemlock Scale (*Fiorinia externa*) is a common pest on Long Island. It is primarily found on eastern, Carolina and Japanese hemlocks. It also infests yew, spruce and fir located close to infested hemlocks, but populations on these species do not reach damaging proportions. Infested hemlocks exhibit mottled yellowing of needles, slowed growth and premature needle drop, resulting in thin, weakened plants.

Females lay eggs over an extended period of time, interrupted only by cold weather. Eggs hatch in about a month. Crawlers migrate to new needles, settle on the undersides and begin to feed. In about a month, females mature and males emerge as extremely small, delicate, winged insects. New eggs are produced 6-8 weeks later. All stages of development may be present simultaneously. Wind may carry crawlers 100 meters or more to new trees.

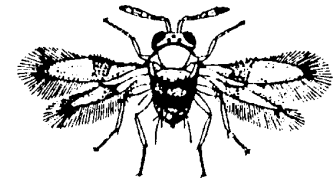
Pine needle scale, *Chionaspis pinifoliae*, also infests hemlock.

See Home Grounds Fact Sheet E-1-25.

Control

Parasites and predators provide some natural control. A small wasp, *Aspidiotiphagus citrinus*, is an effective parasite. Over-population can itself be a controlling factor. Drastic reductions in tree growth and in the amount of healthy needle tissue sometimes reduces the nutritive level of the host to the point where the scales die of starvation, and the tree recovers.

Apply horticultural oil at the dormant rate between 7-120 GDD. Treat crawlers with horticultural oil at the summer rate between 360-700 GDD when tartarian honeysuckle or beauty bush (*Kolkwitzia amabilis*) bloom. (see note A.)

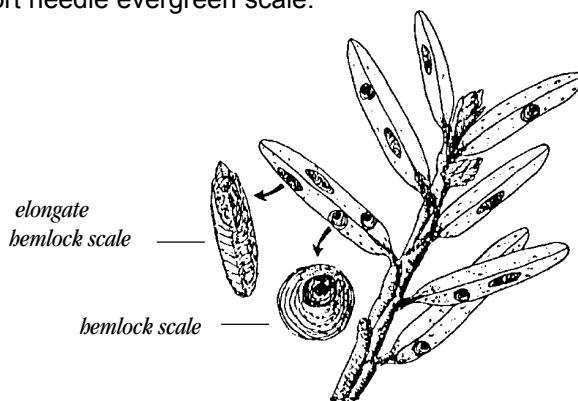


Aspidiotiphagus citrinus, scale parasite

Hemlock Scale

Hemlock Scale (*Abgrallaspis ithacae*) The female scale is dark brown, circular, and about 2 mm in diameter. It feeds on eastern hemlock, but has also been reported on spruce and can be particularly damaging to blue spruce. A small, yellow spot on the upper side of the needle is the symptom first noticed. If four to six hemlock scales take up residence on a single needle, it turns yellow and falls from the tree. Mature scales are always found on the undersides of needles.

Do not confuse this scale with *Nuculaspis tsugae*, short needle evergreen scale.



Control

Wasp parasites, especially *Aspidiotiphagus citrinus*, are important means of natural control and usually keep this scale in check. Parasites emerge four times a year in April, June, July and August. Insecticides for control of scales should not be used when parasites are emerging.

Pesticides should be used only where hemlocks are being extensively damaged. Apply dormant treatment with horticultural oil between 35-121 GDD. If the dormant treatment was missed, use horticultural oil at the summer rate between 1388-2154 GDD when *Abelia* or *Sorbaria sorbifolia* (false spirea) bloom. (see note A.)

COMMON SCALES ON TREES AND SHRUBS

Lecanium Scales

Lecanium scales are soft scales with initially no discernible covering. After the female lays eggs, her hemispherical body dries, becomes brittle and turns brown, protecting the eggs until they hatch. Many people mistakenly think that the dried, brown female is a scale cover. Lecanium scales vary from 3 to 12 mm, depending on species. Even scale experts have difficulty distinguishing one species of lecanium scale from another. Adequate field identification for purposes of control can often be made based on knowledge of scale size, hosts, habits and life cycle.

European Fruit Lecanium (*Parthenolecanium corni*) is the most common and abundant species of lecanium scale. It occurs on smaller twigs of shade and fruit trees, shrubs and other woody ornamentals. Sooty mold usually develops on the honeydew from the scales, making a plant unsightly. Plants may show a loss of vigor as well.

Control

- There are many effective parasites. Care should be taken not to kill them.
- Apply horticultural oil at the dormant rate between 35-145 GDD.
- Apply horticultural oil at the summer rate between 1266-1645 GDD when *Abelia* and golden raintree (*Koelreuteria paniculata*) bloom. (see note A.)

Lecanium scales



Fletcher Scale (*Parthenolecanium fletcheri*) occurs on arborvitae (*Thuja* spp.), yew (*Taxus* spp.), *Juniperus* species and *Pachysandra*. Infestations seldom cause visible injury to arborvitae. Fletcher scale is a serious pest of yew. In heavy infestations, it weakens the plants, causes foliage drop and results in a heavy crust of sooty mold on twigs and needles. Large populations can build up on twigs and stems.

In spring, the juvenile scale grows quickly and plant damage becomes obvious. In May, an average of 500-600 eggs are produced by a single female, but she may produce more than 1,000. All the eggs hatch in a short time, making the crawlers easy to control with one application of an insecticide if the growing degree day recommendations are followed closely.

Control

There are several effective parasites that should be protected. The best way to do this is by using a dormant horticultural oil spray between 38-148 GDD.

If necessary, apply a verdant treatment of horticultural oil between 1029-1388 GDD or 2515-2800 GDD. (see note A.)

note A. Chemical pesticides are available. If you choose to use chemical pesticides, contact your local Cooperative Extension office for specific recommendations.

Other Home Grounds Fact Sheets about scales:

- E-1-8 Euonymous scale
- E-1-11 Juniper scale
- E-1-23 Oystershell scale
- E-1-25 Pine needle scale
- E-1-38 White prunicola scale

For an explanation of G.D.D. (growing degree days), see Home Grounds Fact Sheet E-1-0. Color photographs and detailed text on scales can be found in *Insects That Feed on Trees and Shrubs* by Warren Johnson and Howard Lyon, Comstock Publishing Associates, Cornell University Press, 1988.

"This publication contains pesticide recommendations. Changes in pesticide regulations occur constantly and human errors are still possible. Some materials mentioned may no longer be available, and some uses may no longer be legal. All pesticides distributed, sold or applied in New York State must be registered with the New York State Department of Environmental Conservation (DEC). Questions concerning the legality and/or registration status for pesticide use in New York State should be directed to the appropriate Cornell Cooperative Extension specialist or your regional DEC office (631) 444-0340. Read the label before applying any pesticide. Cornell Cooperative Extension and its employees assume no liability for the effectiveness or results of any chemicals for pesticide usage. No endorsement of products is made or implied."