A photograph of pink magnolia flowers on a dark branch against a clear blue sky. The flowers are in various stages of bloom, with some fully open and others as buds. The petals are a vibrant pink color with some lighter, almost white, variegation. The background is a solid, deep blue sky.

Scale Insects On Ornamentals

Daniel A. Suomi

EB1552E



Scale insects are common on ornamental trees and shrubs. Occasionally they build up in large enough numbers to cause serious damage or death to the host tree. Scales do not resemble typical insect pests, so they often go unnoticed until a large population has developed and caused damage. To prevent damage from scale insects, maintain healthy, vigorously growing trees, monitor insect populations, and use correct control measures when those populations increase.

Ornamentals, by definition, do not bear edible fruits, nuts, or berries. Chemicals labeled for use on ornamentals do not necessarily allow use on bearing plants. Always check the label and follow directions closely.

Hosts and Damage

Scale insects attack many types of trees and shrubs, garden plants, and houseplants. Considerable damage can occur when large numbers of these insects feed upon plants already weakened by environmental stresses, such as drought, or disease. The scale removes plant juices with piercing-sucking mouthparts. At times, certain scale insects produce large amounts of honeydew (an excess of liquid and sugar expelled from their bodies). This sticky material can serve as a growth

Figure 1. Sooty Mold Fungus on Needles

medium for a sooty mold fungus (Figure 1). During times of high populations, some scales become so abundant that an infested portion is totally encrusted with insects (Figures 2 and 3).

Life Cycle

Scale insects have three distinct life stages (egg, immature, adult), and several complete generations may occur in a single year. Eggs are produced by adult females beneath the scale covering or in a cottony material, and in many cases, the cold winter months are passed in this stage. Tiny, six-legged crawlers (Figure 4) emerge from the eggs, move to newer growth on the plant, insert their mouthparts, and begin to feed. A scale-like covering produced from waxy filaments and feces then forms over each individual. Scale species are identified by the color and shape of the covering. The covering protects scales from predation by other insects and from insecticides. The male scale is often a slightly different shape than the female and passes through a tiny, winged stage (Figure 5). Casual observers seldom see this winged stage. Females are wingless and usually remain in one place after inserting their mouthparts into plant tissues.

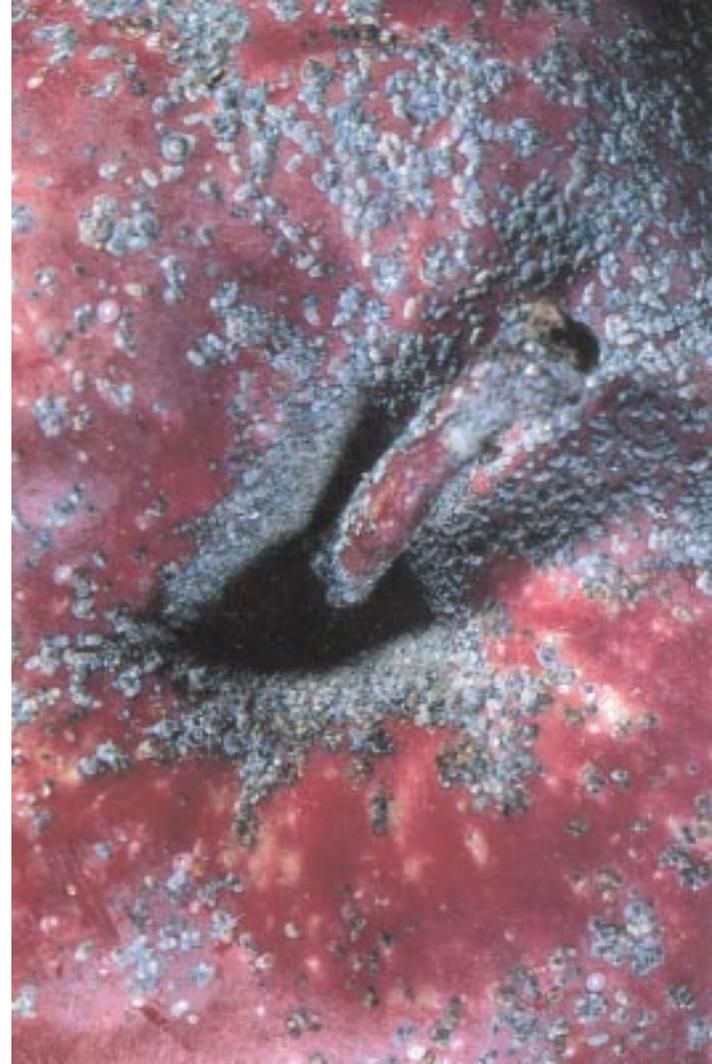


Figure 2. Scale Insects on Apple



Monitoring

A crucial step in scale control is determining when the crawlers emerge. A hand lens or magnifying glass will help you discover when this occurs. Apply double-sided sticky tape near adult scales to trap crawlers as they migrate to new growth. For convenience, you may put an infested branch in water to keep it from drying out, and leave it outdoors in a shady place. Observe the scale eggs every few days for a hatch. You should begin a control program when the crawlers appear. When you consult the life history charts for different scale species, remember that emergence times will vary depending on your location and seasonal weather conditions.

Control

You can control scales in several ways. Apply dormant (or delayed dormant) oils; they work by cutting off the insect's oxygen supply (see PNW328 for more information). Use these oils when plants are not actively growing (late winter to early spring). Using too much oil may cause burning or other damage to plants. Oils must be applied when temperatures are greater than 40°F to prevent separation of oil and water. Apply a light, superior oil-insecticide mixture just as plants begin to grow to control emerging crawlers. This time period

usually lasts only a few days—timing is critical. The oil must be applied before leaves open, yet late enough so that this mixture will kill the crawlers.

The best time to apply any insecticide is when crawlers are present. These tiny insects do not have a protective covering and are vulnerable to almost any chemical registered for this use. Cyfluthrin, malathion, acephate (Orthene), or insecticidal soap are all registered for crawler control. Cover the plant thoroughly to kill the crawlers with one application. Read the label and use these insecticides when bee activity is limited. Systemic insecticides (such as Orthene) applied as a foliar spray or incorporated into the soil, can help control adult scale insects during the growing season. Each situation is unique; it is important to know which scale species is present. Read chemical labels to determine if any restrictions apply to your particular situation and be certain the plant you intend to spray is indicated on the label.

Systemics vs. Contact Insecticides

Use systemic insecticides to control insects that feed with piercing-sucking mouthparts inserted into plant tissues. Apply the materials either as a foliar spray, where the insecticide concentrates in leaves, or as a root



drench, where the plant's water-conductive tissue, known as xylem, transports the material to the leaves from the roots. Scale insects found on bark feed in the food transport tissue, called phloem, and do not feed on xylem tissue. Therefore, phloem feeders are not killed by systemics. The exception to this occurs if an insecticide has both contact and systemic activity (e.g., Orthene) and is applied when the scale is vulnerable to contact pesticides. Thorough coverage is important when using contact insecticides since many crawlers feed on the undersides of leaves and on twigs, branches, or trunk. Scale insects feeding on leaves will be killed by systemics, as these concentrate in leaf tissue whether they are applied as direct sprays or as a root drench.

The following pages describe several major scale species in the Pacific Northwest. Use the photographs to identify the scale insect infesting the plant(s), then determine if beneficial insects (e.g., ladybird beetles or lacewings) are active. These beneficials often will reduce scale infestations to levels where no other controls are necessary.

If no beneficials are present and scales occur in large numbers, select an insecticide appropriate for

that species. Consult the chart for the best time to apply materials. Examine the site or situation carefully. Avoid applying insecticides in places where they could injure animals, such as bodies of water, vegetable gardens, or near pet food dishes.

Scale Categories

TYPE I scales feed on foliage.

TYPE II scales feed through the bark of branches and trunk.



Figure 5. Male Scale Insect

Juniper Scale

Carulaspis juniperi

Hosts: arborvitae, chamaecyparis, cypress, juniper, red cedar

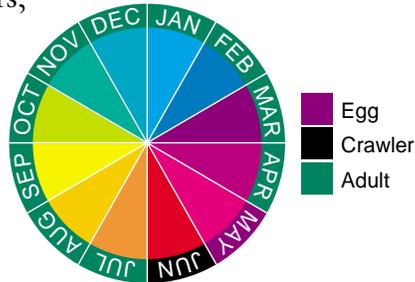
Damage: loss of green luster, leaves turn dull green or brown, no new growth on infested foliage

Description: TYPE I scale, female $\frac{1}{16}$ " in diameter, round, off-white with a central yellow dot; bright yellow crawlers migrate to newer growth to feed.

Overwintering Stage: adult scales on leaves

Other Factors: one female scale produces up to 40 eggs under the covering; scale and crawlers can be moved between hosts by animals or humans.

Control: dormant oil in late March to early April; malathion 50% emulsifiable concentrate (EC), insecticidal soap, or cyfluthrin 0.75% EC when crawlers emerge; oils may cause discoloration on certain junipers; if in doubt, test a small area before using oil on the entire plant.





Pine Needle Scale

Chionaspis pinifoliae

Hosts: all species of pine and occasionally Douglas-fir, spruce, cedar

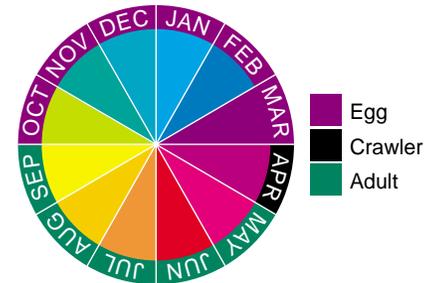
Damage: weakens and slows growth, foliage becomes yellowish; in heavy infestations foliage appears white.

Description: TYPE I scale, female $\frac{1}{8}$ " long, pear-shaped, white, waxy; reddish crawlers.

Overwintering Stage: eggs under female scale covering

Other Factors: one generation per year (possibly two in western Washington, second generation nymphs appear in July); each female produces up to 100 eggs; nymphs dispersed by wind; this species is a problem especially along dusty roads and on stressed trees.

Control: dormant oil in spring before plant growth begins; malathion 50% EC, insecticidal soap, or cyfluthrin 0.75% EC for crawler control.



Lecanium scale

Parthenolecanium spp.

Hosts: alder, arborvitae, blueberry, dogwood, elm, hawthorn, maple, linden, poplar, raspberry, rhododendron, willow, yew, most fruit trees, and many other plants

Damage: plant loses vigor, leaves are smaller or do not form.

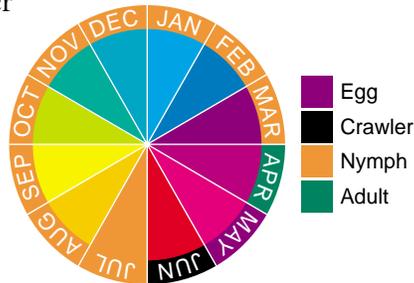
Description: TYPE I (overwintering and mature) and TYPE II (crawler) scale, $\frac{1}{8}$ "– $\frac{3}{16}$ " long, typically shiny brown, turtle-shaped, clusters in large numbers on small branches at leaf axils, nodes, or fruit spurs.

Overwintering Stage: immature scales on branches

Other Factors: one of the most frequently encountered species; a single generation each year; the immature scales, unlike most others, remain mobile throughout their life; subject to rapid increases and declines in populations.

Control: many predators and parasitoids attack Lecanium scale, chemical control often is unnecessary;

dormant oil in late winter to early spring; immature scale control from June–September using cyfluthrin 0.75% EC, Orthene 9.4% EC, or insecticidal soap.





Oystershell Scale

Lepidosaphes ulmi

Hosts: over 400 broadleaf trees (including ash, maple, poplar, willow), shrubs, herbaceous plants, and fruit trees (especially apple)

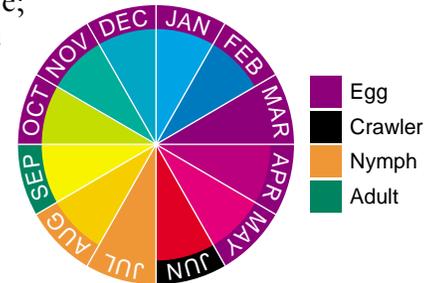
Damage: weakens, and if abundant and not controlled, will kill large portions of the plant.

Description: TYPE II scale, $\frac{1}{8}$ " long, generally brown to ashy gray, resembling tiny oystershells; yellowish crawlers pass through a "white cap" stage; new infestations are pinkish in July–August, while old scales are gray or black.

Overwintering Stage: as eggs under the female scale covering; highly resistant to dormant applications of insecticides

Other Factors: probably the most readily recognized scale as large numbers often found massed together encrusting bark of trunk and branches.

Control: numerous predators and parasites attack this scale, but are usually ineffective; malathion 50% EC, cyfluthrin 0.75% EC, or Orthene 9.4% EC for crawler control; spray when crawlers first emerge and about 10 days later to kill those still emerging from eggs.



San Jose Scale

Quadraspidiotus perniciosus

Hosts: alder, apple, birch, cherry, cotoneaster, elm, maple, peach, pear, poplar, willow, and many other deciduous trees and shrubs, especially damaging to fruit trees

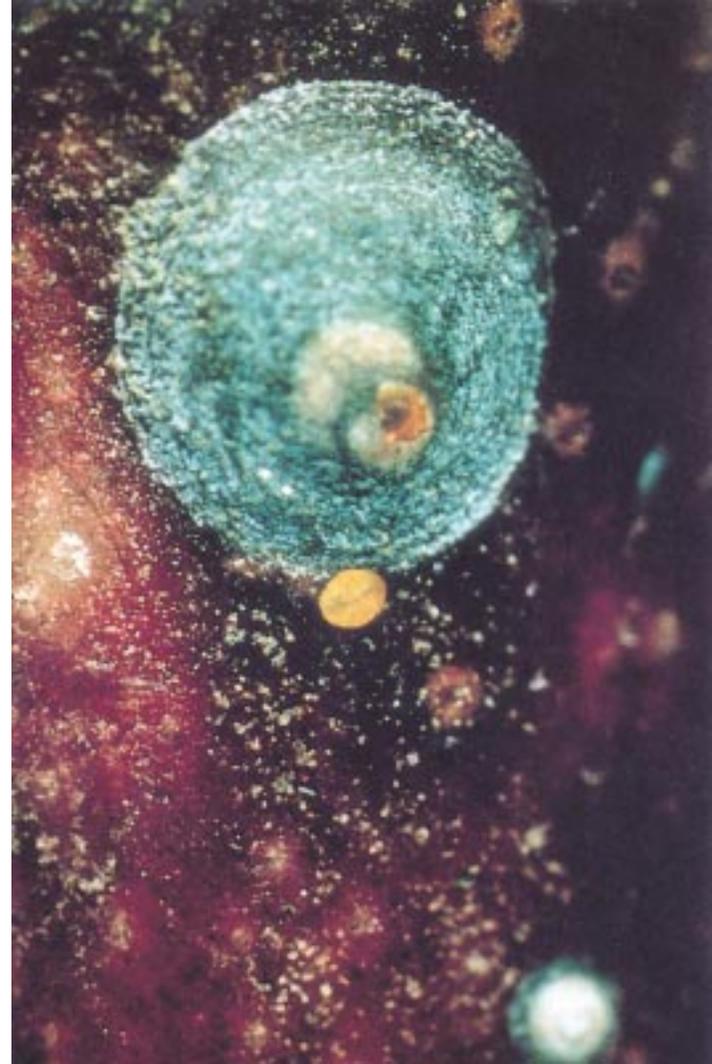
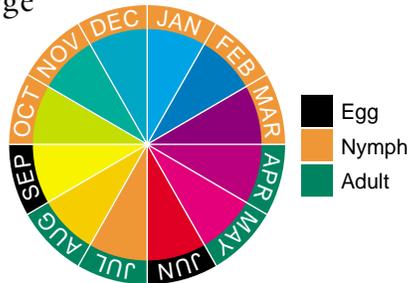
Damage: found on twigs, branches, leaves, and fruit, often killing the infested portion of the tree, reddish spots appear where the scales are feeding; bark appears shaggy or rough.

Description: TYPE I and II scale, $\frac{1}{16}$ " in diameter, female scale gray with a central, yellow dot; crawlers are yellow.

Overwintering Stage: as black-colored immature scales on bark, very susceptible to dormant applications of insecticides.

Other Factors: very common and destructive scale; crawlers can be moved by wind, birds, or humans.

Control: predators will help keep small scale populations in check, but when large numbers of scales are present, chemical control is necessary; use a dormant oil to suffocate overwintering forms; cyfluthrin 0.75% EC or insecticidal soap for crawler control.





Spruce Bud Scale

Physokermes piceae

Hosts: spruce (certain pines also have been recorded as hosts)

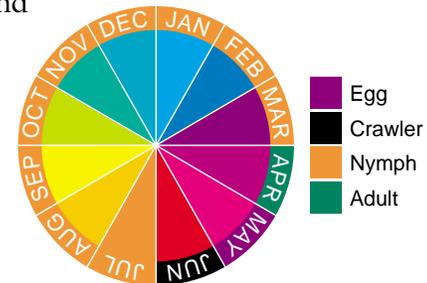
Damage: found especially on lower branches of spruce, young feed on needles, adults feed on small branches; abundant honeydew produced.

Description: TYPE I and II scale, $\frac{1}{8}$ " in diameter, mature scales reddish brown and globular, found in clusters of three to eight at the base of new twig growth; crawlers are olive brown.

Overwintering Stage: young scales on the underside of needles

Other Factors: these scales so closely resemble spruce buds that they often are overlooked; excessive honeydew production leads to growth of black sooty mold that gives the tree an unhealthy appearance, honeydew attracts many bees, wasps, and ants.

Control: delayed dormant oil in spring (Colorado blue spruce will discolor when oil is used); Orthene 9.4% EC, or insecticidal soap for crawler control.



Cottony Maple Scale

Pulvinaria innumerabilis

Hosts: primarily maple, but will attack many ornamentals including alder, apple, dogwood, elm, lilac, pear, poplar, and willow

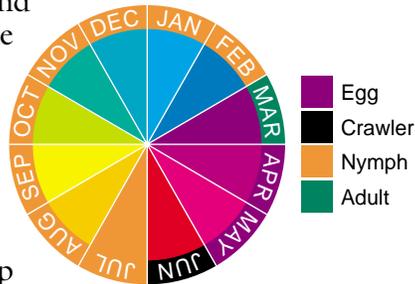
Damage: withdrawal of sap causes dieback of twigs and branches, and in large infestations, causes tree death; honeydew and sooty mold accompany large populations.

Description: TYPE I and II scale, fully developed scale $\frac{1}{4}$ " long, dark; flattened scale produces large white, cottony egg sac; crawlers are green-yellow.

Overwintering Stage: as immature scales on twigs and branches, this stage is susceptible to dormant insecticidal applications.

Other Factors: one of the largest scale insects on ornamentals; females can produce up to 1,000 eggs; crawlers feed on leaves throughout the summer and move back to twigs in the fall.

Control: many predators and parasites attack cottony maple scale and often reduce population numbers to levels that will not damage the tree; dormant oil in late winter before tree growth begins; Orthene 9.4% EC, or insecticidal soap for crawlers on leaves.





Brown Soft Scale

Coccus hesperidum

Hosts: camellia, dogwood, daphne, holly, but especially a pest of greenhouse ornamentals and houseplants

Damage: build up in large numbers on leaves and may kill the host plant; produce abundant honeydew.

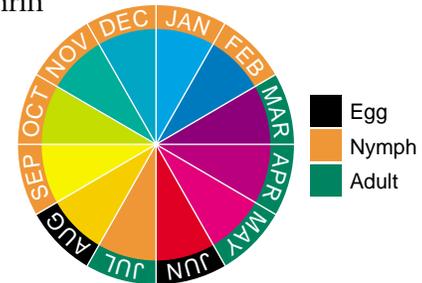
Description: TYPE I scale, $\frac{1}{8}$ "– $\frac{3}{16}$ " in length, oval, flattened, soft shell, green-brown in color; crawlers yellow-brown

Overwintering Stage: as immature scales on leaves

Other Factors: these scales feed on leaf undersurface and often are overlooked; primarily a pest of indoor ornamentals; two generations per year outside, up to six generations indoors.

Control: numerous predators and parasites control these insects in ornamentals outdoors, predators can offer relief from scale infestations if introduced into greenhouse settings; cyfluthrin

0.75% EC can be applied to control adult scales, but thorough coverage is necessary; Orthene 9.4% EC or insecticidal soap for crawler control.



European Elm Scale

Gossyparia spuria

Hosts: elm

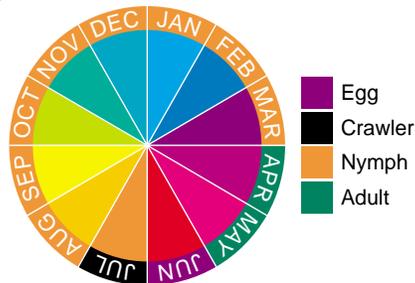
Damage: causes premature yellowing and loss of leaves, then twigs and branches die back, small trees may be killed; abundant honeydew produced.

Description: TYPE I and II scale, 1/8" long, reddish brown with a conspicuous fringe of white cottony wax; crawlers are brown.

Overwintering Stage: as immature scales in cracks of bark on small branches and branch crotches, susceptible to dormant insecticide applications.

Other Factors: immature forms resemble mealybugs; this insect can cause extensive damage to elms.

Control: apply dormant oil to twigs and branches before buds swell in spring; for crawler control, apply Orthene 9.4% EC (only for Siberian and Chinese elm), cyfluthrin 0.75% EC, or insecticidal soap.





Azalea Bark Scale

Eriococcus azaleae

Hosts: andromeda, azalea, blueberry, hawthorn, rhododendron, willow

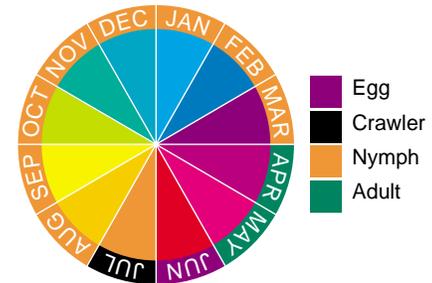
Damage: found on the bark of twigs and stems; when large numbers are present, plant becomes yellow, stunted, or weakened; abundant honeydew on which sooty mold thrives.

Description: TYPE II scale, adult female is red, $\frac{1}{16}$ " long, round, and covered by a white, waxy sac; crawlers are red.

Overwintering Stage: as partially developed nymphs on bark

Other Factors: usually one generation per year, but has potential for two in the southern part of Washington.

Control: this scale often is heavily parasitized; when chemical control is necessary, apply cyfluthrin 0.75% EC, malathion 50% EC, or Orthene 9.4% EC to branches for crawler control.



Cottony Camellia (Taxus) Scale

Pulvinaria floccifera

Hosts: camellia, English ivy, holly, hydrangea, maple, rhododendron, yew

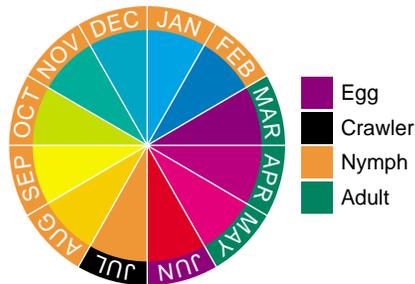
Damage: causes off-colored or light green foliage; weakens plant over time; honeydew and sooty mold become abundant.

Description: TYPE I scale, mature form light brown to yellow, oval, $\frac{1}{8}$ " long, after laying eggs, female scale has a white sac attached, in time the brown covering disappears leaving only the egg sac attached to plant surfaces; egg sacs are $\frac{1}{4}$ " long and may contain up to 1,000 eggs; light yellowish tan crawlers.

Overwintering Stage: as immature nymphs, usually on twigs and leaves

Other Factors: eggs hatch in early summer in most parts of its range.

Control: apply Orthene 9.4% EC, malathion 50% EC, or insecticidal soap for crawler control.





Hemlock Scale

Abgrallaspis ithacae

Hosts: spruce, hemlock

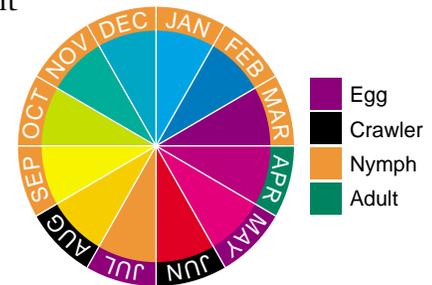
Damage: particularly in Colorado blue spruce, the tree loses vigor and sheds large numbers of needles, creating extensive bare areas, severe infestations result in death of host.

Description: TYPE I scale, $\frac{1}{16}$ " in diameter, oblong to elliptical, female scale brown to gray with a prominent, central dot; crawlers are green to yellow.

Overwintering Stage: as dark brown to dark gray immature scales on needles, susceptible to dormant applications of insecticides or oils

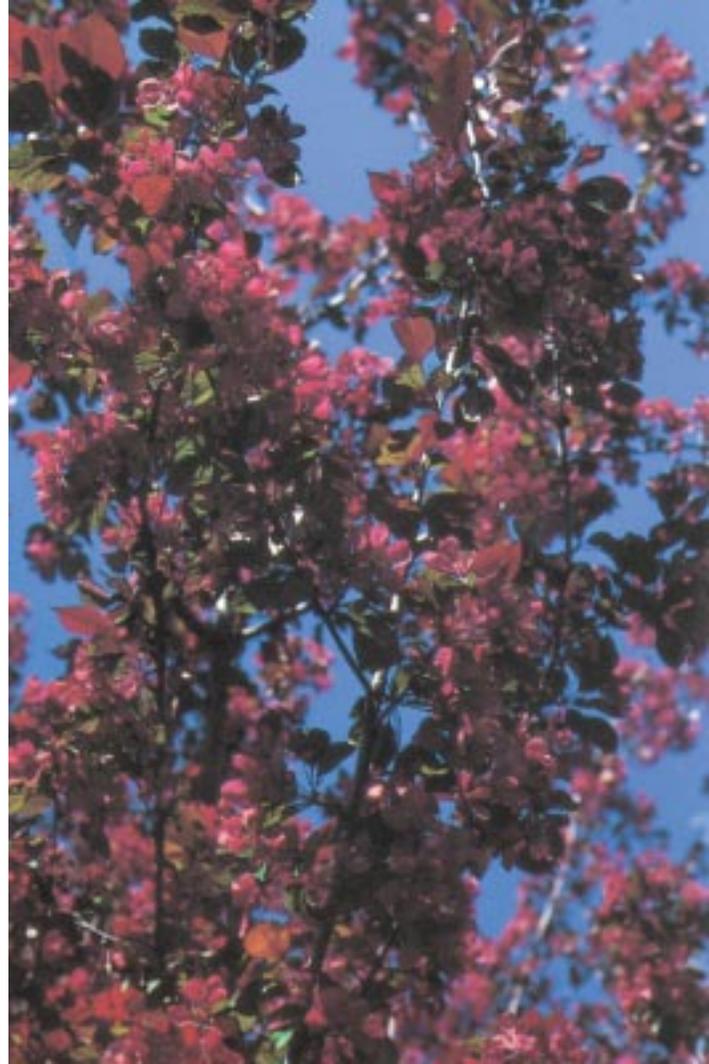
Other Factors: very common and destructive in central Washington on spruce, especially Colorado blue spruce, most common on trees under stress.

Control: predators are not effective in reducing populations; control with dormant oil sprays just before bud break (be cautious of needle discoloration on blue spruce); cyfluthrin 0.75% EC, malathion 50% EC, or insecticidal soap for crawler control.



Daniel A. Suomi, former entomologist at Washington State University, Pullman, furnished the photographs for pages 2, 3, 4, 20, and back cover. *Roger D. Akre*, Washington State University entomologist (deceased), provided the photographs for page 1 (sooty mold), page 6 (juniper scale) and page 14 (European elm scale). Photographs on pages 11 and 15 provided by *Art Antonelli*, Extension Entomologist, WSU. Front cover photograph by *Brandon Burch*, © 1990.

Use pesticides with care. Apply them only to plants, animals, or sites listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is a violation of the law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.





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