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## Control of Scale Insects on Trees and Shrubs

Scale insects don't resemble the usual form of insects. Most scale insects don't move about much after they begin to feed; so they often go undetected when trees and shrubs are inspected to determine the cause of death or loss in vitality.

Yet their damage is often conspicuous and severe because they devitalize the plant by sucking the sap. Extensive withdrawal of plant juices causes discoloration and eventually drying of leaves or needles. This feeding may cause death of the tree or of heavily infested parts. Also, the feeding damage makes a tree more susceptible to winter injury and disease.

Many scale insects excrete a sticky sweet fluid called honey dew which may become so abundant that the leaves glisten in the sunlight. Usually a black sooty mold fungus grows on the honey dew, causing foliage and branches to look black. These two conditions are often the first symptoms of scale infestations.

The scales may appear as brownish, reddish, or grayish growths or small swellings on twigs or foliage. Pine needle scales appear as white spots on needles. Heavily infested branches may seem to be encrusted with scales.

Both deciduous (leaf-shedding) and evergreen trees and shrubs are attacked by one or more species of scale insects. For control of most species, a thorough spraying with an insecticide, properly timed, is essential (see the table for insecticide dosage).

### Scales on Evergreen Trees and Shrubs

The pine tortoise scale, primarily a pest on jack pine and Scotch pine, attacks branches and stems of young trees. Scales are reddish brown, convex, and from 1/8 to 1/4 inch in diameter. In light infestations, scales tend to cluster toward branch tips. Their presence is often made evident by the conspicuous sooty mold that grows on their honey dew and by a yellowing of needles on terminal twigs.

The fertilized female scale overwinters on twigs; lays eggs in June; and crawlers hatch toward the end of June or early July. The reddish or grayish crawlers move rapidly over the branches; after a few days they settle down to feed on the bark.

Male scales are elongated white creatures while females are round and mahogany color. Control them with a thorough spraying with malathion during mid-summer when crawlers are active.

The pine needle scale is one of the most common and conspicuous scale insects found on evergreens. Pines and spruces are attacked in Minnesota -- the mugho pine is the most susceptible to severe injury. Scales look like elongated white spots on the needles. When scales are abundant, the tree may appear gray or white and foliage is off-color.

This species hatches in May. The reddish crawlers move over the needles for a few days and then settle down to feed. Start spraying when crawlers first appear. Generally, you should apply a second spray about 10 days later. Malathion is an effective crawler spray.

Fletcher scale is a Lecanium scale that attacks arborvitae and yew. It causes drying of the foliage and dieback of the branches. The brownish convex scales are about 1/8 inch long. They feed on foliage and stems of arborvitae and principally on stems of yew.

The life cycle is similar to that of the European fruit Lecanium but the crawlers show little tendency to migrate after they start to feed. Eggs hatch about the 1st week of July. Spraying with malathion

when crawlers are active has given good control. In heavy infestations make two applications about 7 to 10 days apart.

Spruce bud scale is reddish brown and about 1/8 inch in diameter. The scales generally cluster on the base of recent twig growth. Lower branches are usually infested first. Black sooty mold frequently develops on the honey dew.

Eggs hatch in June and crawlers feed by sucking the sap. They then move to bases of terminal buds to overwinter in a partly grown condition and mature in spring. For control, apply crawler sprays of malathion from mid-June to mid-July.

### Scales on Deciduous Trees and Shrubs

The cottony maple scale is one of the most conspicuous scale insects. During the summer it lays eggs in large cottony masses that extend back of the scale. Honey dew and sooty mold on leaves and branches also call attention to its presence.

This scale attacks maple, boxelder, black locust, basswood, and elm. It overwinters as a fertilized female which is a brown convex scale found on the twigs.

Conspicuous egg masses are produced from June until late summer. Upon hatching, the flat, oval crawlers move to leaves and feed along veins. In the fall the scales migrate to the underside of twigs where they overwinter.

Because of the prolonged egg-laying period, it is difficult to kill all crawlers with one spray application. However, malathion applied in June and July greatly reduces the population. For the most effective control, apply a dormant oil before new growth starts in the spring. Use a "superior" oil to reduce the chance of oil injury to susceptible trees or plants.

Cottony maple scale is rarely serious on a particular tree for more than two years. So on vigorous trees, chemical control may not be needed.

The oystershell scale is probably the most common scale insect pest found on broadleaf trees. The scale feeds on trunks, branches, and twigs. Mature scales are about 1/8 inch long, grayish brown, and elongate. They resemble tiny oystershells with one end broader than the other. They attack many broadleaf trees and shrubs including apple, elm, birch, cotoneaster and lilac.

The winter is passed in the egg stage beneath the scale. Hatching is generally in late May or early June, about one week after apple petal fall. Spray in the early summer soon after the eggs hatch -- when the newly hatched crawlers are still moving about. Use malathion or carbaryl (Sevin). Or apply a dormant oil spray before any new growth starts in the spring.

The European fruit Lecanium, or brown elm scale, is convex and reddish brown. (Species of Lecanium scales are commonly found on a wide variety of trees and shrubs.) This insect's life cycle is similar to that of the cottony maple scale except that: (1) it does not produce cottony egg masses, and (2) eggs generally hatch in a 2- or 3-week period.

Like the cottony maple scale, the crawlers move onto leaves where they feed during the summer; they then migrate to twigs to hibernates. For control, spray with a dormant oil before the new growth starts in the spring, or spray with malathion soon after the eggs hatch.

Eggs are laid under scales in June and hatching occurs 2 or 3 weeks later. Examine infested branches frequently to detect the presence of crawlers.

The European elm scale is a destructive insect pest of American elms. It attacks only elms -- usually the lower limbs. The overwintering nymphs mature during the summer; at that time they are quite conspicuous on the bark. They are brownish, oval in shape, and surrounded by a fringe of white waxy excretion. They leave a reddish stain when crushed.

The nymphs mature in June or July and lay eggs which hatch in July. The young crawlers move to new locations on twigs and branches to feed and settle for the winter.

You can control this scale with a dormant oil spray in the spring or malathion or carbaryl (Sevin) crawler sprays after the eggs hatch. Follow both treatments for severe infestations. The summer spray is not as effective as it is on the Lecanium scales.

Scurfy scales are common pests of elm, willow, maple, and hackberry. The mature scales are dirty white or gray. They often completely encrust the smaller twigs and branches of heavily infested trees. The reddish eggs are laid in the fall under the scales and usually hatch in June. For control, spray with a dormant oil before new growth starts in spring or with crawler sprays in June and July.

### Notes on Spraying

Timely and thorough applications of recommended spray materials are necessary for good control of scale insects. The most satisfactory control has generally been obtained with hydraulic sprayers that deliver a large volume of total spray. They put out enough liquid

to thoroughly wet tree surfaces -- this is important in the application of dormant sprays.

If you use mist blowers, increase the insecticide concentration about four times because a smaller volume of liquid is delivered to the tree. You can use small hand-operated pressure sprayers to treat small trees and shrubs. Dusts are not as effective as sprays and are not recommended for scale insect control.

A 40- to 50-foot shade tree probably requires at least 10 gallons of dormant spray mixture delivered with a hydraulic sprayer to get good coverage. Larger amounts, 20 to 25 gallons, are needed for summer sprays applied to kill the crawlers after the leaves have expanded. See the table for correct sprays and dosages.

### Systemic Insecticides

Several systemic insecticides are available to control some scale insects on specific hosts. Some may be applied as foliar sprays and others as soil treatments. Most of these products are for use by commercial growers or professional applicators only. For more information contact your pesticide supplier or the Department of Entomology, Fisheries, and Wildlife, University of Minnesota.



### Insecticides and Dosages

Insecticide	Amount to use in:		Time to apply
	100 gallons	1 gallon	
Dormant sprays			
Dormant, miscible petroleum oil (some commercial dormant oils may contain 2% ethion; or 50% diazinon wettable powder may be added to the dormant oil spray at the rate of 1 pound per 100 gallons of dilute spray.)	3 gallons	½ cup	Apply during dormant season at above freezing temperatures before leaf buds open. Early spring is generally best but you may safely spray vigorous, well established trees in good condition in the fall.
Note			
Dormant oils should be used on deciduous trees and shrubs only. Young maples may be injured by dormant oils.			
Crawler or summer sprays			
(use one of the following)			
Malathion:			
50-57% emulsion concentrate	2-2½ pints	3 teaspoons	Apply after eggs hatch -- while crawlers are active. See text for proper time.
25% wettable powder	6 pounds	6 tablespoons	
Carbaryl (Sevin) 50% wettable powder	2 pounds	2 tablespoons	

Trade names are sometimes used in this publication to clearly describe products. The use of a trade name does not imply endorsement by the Minnesota Agricultural Extension Service, nor does omission of other trade names imply nonapproval.

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