

# Scale Insects of Christmas Trees

Bryan D. Bishop, Department of Entomology  
Deborah G. McCullough, Department of Forestry and Entomology  
Tom Ellis, Department of Entomology



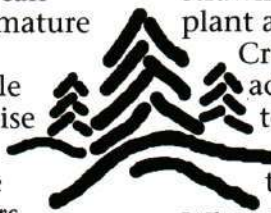
## Pine Tortoise Scale

The pine tortoise scale, *Toumeyella parvicornis*, feeds on many species of pines, including Scotch, Eastern white, Austrian and Chinese pines.

### Biology

Female adults, the stage most commonly seen on Christmas trees, are easy to recognize. Female scales are small (2-4 mm long) and reddish-brown with dark patches along their back. Oval in shape, they resemble miniature tortoise shells because of their shape and color. Female scales are found on the woody part of shoots, not on the needles.

Each fertilized female can produce up to 500 immature scales called crawlers. Crawlers are the mobile stage of the pine tortoise scale, and are usually present in mid- to late June. The tiny crawlers are yellowish-red in color. Crawlers will disperse and



Pine tortoise scale infestation

settle on current-year shoots. They feed by inserting strawlike mouthparts into the plant and sucking plant sap. Crawlers may move to adjacent trees if trees touch one another, or they may be carried by the wind to other trees. Whitish, overlapping flakes (1-2 mm in length) can also be found on twigs with scales by

late July or early August. These are the pupae of the male scales that mate with females, then die. The fertilized females overwinter, sometimes appearing black and dead. In the spring, the female scales begin feeding again, doubling in size, until they release the next generation of scales.



## Damage

Early indications of infestation include the presence of black sooty mold, adult scales, and white pupal cases from the previous year.

Feeding by large populations of scales can cause dieback of shoots and branches, slow growth and, in severe cases, tree death. However, the most significant damage to Christmas trees results from black sooty mold which grows on needles and shoots of infested trees. Fertilized female scales secrete a sugary solution called "honeydew" as they feed on plant sap. Honeydew drips onto needles and shoots, providing ideal conditions for growth of the sooty mold fungus. Ants are attracted to the syrupy honeydew and will protect feeding scales from their natural enemies. Black sooty mold is nearly impossible to remove from trees. If scale populations are controlled, the appearance of the tree can be restored in two to three years, after all affected needles are shed.

## Control

### Cultural

Scout fields regularly to identify pine tortoise scale infestations while populations are small. Shearing trees after crawlers have settled will eliminate a large amount of the scale population. Minimize contact among trees to slow the spread of crawlers from one tree to another. Heavily infested trees should be rogued out of fields and destroyed. However, do not transport heavily infested trees through the field while crawlers are active in mid- to late June. Controlling ants in



Scotch pine shoot with pine tortoise scale and black sooty mold

Christmas tree fields may help reduce populations of scales.

### Biological

Heavy populations of scales are not common in pine forests because of natural enemies such as parasitic and predatory insects.

Tiny parasitic wasps kill a large number of pine tortoise scales; up to 50 percent of the population may be killed even when protective ants are present.

Immature scales are parasitized right after the crawler stage. Parasitic wasps complete their development within scales and begin emerging from scale bodies in early to mid-June. Parasitic wasps leave telltale exit holes in the adult scale.

A ladybird beetle (ladybug) is also an important natural enemy of pine tortoise scale, often eating an entire population in a single season. The adult ladybird beetles are black with two red dots. The immature stage of the beetle is also an effective natural enemy. Beetle larvae are soft

and white with long tufts of "hair" on their backs. Ants can drastically reduce the effectiveness of both adult and larval ladybird beetle predators, but are less effective in driving off the parasitic wasps.

### Chemical

Infestations of pine tortoise scale are usually very localized, affecting small "pockets" of trees. Monitor infested trees regularly to determine when crawlers have hatched.

Infested trees can be treated with a registered insecticide during the active crawler stage. Treat only infested trees, as pine tortoise scale populations do not spread rapidly. Spot-treating only infested trees will help preserve populations of natural enemies such as parasitic wasps.

Consider using insecticidal soaps, horticultural oils, superior oil or other paraffinic oils in late fall or early spring to control overwintering female scales. Good coverage is essential if soaps or dormant oils are used. Soaps and oils



will not harm beneficial insect predators such as ladybird beetles. Contact your county MSU-Extension office for information on appropriate registered insecticides.

## Pine Needle Scale

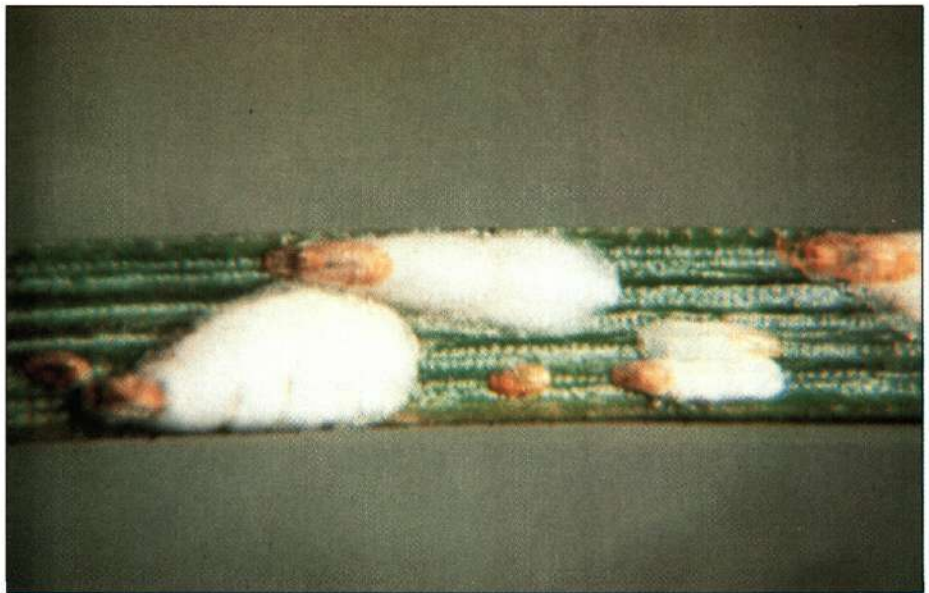
Pine needle scale (*Chionaspis pinifoliae*), also known as "white scale," attacks Scotch pine and nearly all other species of pine grown in Michigan. Douglas fir and spruce species may also be infested.

### Biology

Adult female scales are easily recognizable and are the stage commonly seen on Christmas trees. Scales are white, "oyster-shaped" or oblong flecks on pine needles. Females lay reddish-brown eggs underneath the white scale covering in mid-August and then die. Eggs overwinter under the waxy white exoskeleton of the dead adult female. Eggs hatch the following spring, usually about mid-May to early June. The reddish-colored crawlers are the immature stage of the scale and are mobile. Crawlers move about the tree to find a suitable site for feeding and can be blown to surrounding trees or other fields by spring winds. Crawlers settle on a suitable needle, insert their strawlike mouthparts into the needle, and begin feeding on plant sap. Scales feed and grow for several weeks, then mature into adults in early July. Scales mate and a second generation is produced about mid-July. This generation of scales feeds until mid- to late August, when eggs are laid and females die.



Pine needle scale infestation on Scotch pine



Pine needle scale infestation on Scotch pine

### Damage

High populations of pine needle scale affect the appearance of Christmas trees and can reduce market values. Heavy infestations can also cause needles to become yellow or die. Severe and prolonged scale feeding cause entire branches to die and, in extreme cases, causes the death of the entire tree.

### Control

#### Cultural

Scouting and monitoring is critical for management of pine needle scale. Infestations often begin on the lower branches of trees. Turn over





shoots to see if scales are present on the undersides of needles. Do not transport infested trees through the field when crawlers are present.

### Biological

Pine needle scales may be killed by ladybird beetles (ladybugs), tiny parasitic wasps, cold winter weather and disease. Natural enemies may provide adequate control of pine needle scale populations, especially if trees are several years away from harvest.

### Chemical

If scouting indicates that control is needed, a registered insecticide can be used. To be effective, insecticides must be applied when crawlers are present. In Michigan, use the first blooming of lilac bushes to help time insecticide application. Pine needle scale crawlers typically hatch from eggs about the time that lilacs bloom in spring. Insecticide treatment during the second generation is needed only in severe infestations, when trees are within one to two years of

harvest. Dormant oils can be used in some situations to kill scales without harming beneficial insects. Do not use dormant oils on spruce trees that are within one to two years of harvest, as the oil may cause discoloration. Contact your county MSU-Extension office for information on appropriate registered insecticides.

### Authors

Bryan D. Bishop<sup>1</sup>,  
Deborah G. McCullough<sup>1,2</sup>  
and Tom Ellis<sup>1</sup>

<sup>1</sup>Dept. of Entomology

<sup>2</sup>Dept. of Forestry

Michigan State University



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