



# Scale Insects on Conifers

## Forest Health Fact Sheet

June 2017



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Outbreak-level populations of black pineleaf scale on ponderosa needles

Black pineleaf scale (*Nuculaspis californica*) is one of the more commonly encountered scale insects on pine and sometimes Douglas-fir trees, in Oregon. Another scale common to conifer is the pine needle scale (*Chionaspis pinifoliae*), which is found on pine and sometimes fir, Douglas-fir, spruce, hemlock and occasionally cedar. As the name implies black pineleaf scale is usually black. Pine needle scale is usually white. Both are armored scales which are sucking insects that feed on tree phloem and cause discoloration of needles, loss of older needles, reduced growth in new needles and shoots, and branch dieback. Damage from these insects can increase susceptibility to bark beetles. Scale outbreaks often occur near urban and agricultural areas due to drift from mosquito control and agricultural sprays or dust from roads, all of which can depress natural enemy populations.

### Hosts

- Major: most pine species
- Minor: true fir, Douglas-fir, spruce, hemlock

Both scale species are widely distributed in North America. They are frequent pests of ornamentals, off-site plantings, shelterbelts, or trees along dusty roads or agricultural areas.

### Biology

In Oregon, these scales both have one generation per year. The scales that are typically visible on needles are wingless and immobile females. Eggs are laid under the female's 'shell' in June and hatch into mobile nymphs or 'crawlers' around July. The only method by which female scales can spread to new hosts is for the crawler stages to be picked up by the wind and blown onto nearby trees. Most crawlers remain on the same tree and simply migrate to new needles. By early August, crawlers settle on a needle and transform into their immobile stage. Scales can also feed on needles on warm days during winter and spring months.



James Hanson, USFS, Bugwood.org; Christine Buhl, ODF

Pine needle scale (top) and black pineleaf scale (bottom)

## Damage

In ponderosa pine, thinning foliage in the mid- to lower-crown is frequently a sign of a black pineleaf scale infestation. Often, infested branches retain only new needles resulting in a 'lion's tail' appearance. Close examination of the needles will reveal a row of black or white scales along its length. At the point of scale attachment to the needle there is usually a necrotic yellow spot. If enough scales are present, the entire needle may have a yellow cast. When looking for signs of scale infestations on large pines, where living foliage is not easily reached for examination, scales can often still be found on shed needles around the base of a tree.



Christine Buhl, ODF

'Lion's tail' from needles lost to black pineleaf scale

In eastern Oregon most black pineleaf scale outbreaks are triggered by man-made disturbances such as pesticide drift or excessive dust from roads. An increasing number of scale outbreaks have been occurring in pine and Douglas-fir stands at low elevations (0 - 3,500 feet) that do not appear to be associated with pesticides or dust. The severity of a scale infestation can be determined by counting the number of scales per inch of needle. Non-damaging or endemic scale populations have densities of <math><0.5</math> scales/inch. Growth loss occurs when needles have >math>4</math> scales/inch. Trees have an increased probability of mortality when needles have >math>20</math> scales/inch. Most scale outbreaks cover small areas, but they have the potential to grow and persist for many years.

## More information:

Oregon Dept. of Forestry, Forest Health  
<http://tinyurl.com/odf-foresthealth>  
2600 State St. Bldg. D, Salem, OR 97310  
503-945-7200

## Management highlights

- Drift from mosquito control and agricultural sprays harm natural enemies, which control scale populations
- Pines growing on sites with rocky or compacted soil are less resilient to scale outbreaks
- Appropriately-timed contact or systemic insecticide applications may be effective

## Management

### Natural

Several species of parasitic wasps and ladybird beetles control scale populations. Parasitic wasps, in particular are very sensitive to non-selective insecticides. If these wasps are killed, scale populations rapidly increase to damaging levels. Outbreaks resulting from insecticide drift may subside 1-2 years after spraying is discontinued or altered, to allow parasitoid and predator populations to recover. Weather also plays an important role in regulating scale populations. A rapid freezing event can dramatically lower survival.

### Silvicultural

Increasing tree vigor by reducing competition or increasing irrigation may lead to greater tolerance to scale attacks. Pines growing on rocky sites or on soil compacted by equipment or cattle, are far less tolerant of scale attacks.

### Insecticides

Insecticide sprays are most effective at the crawler stage. Spraying must be timed for the brief period in July when crawlers migrate to new needles. After crawlers have settled on new needles and have developed a 'shell', application of these contact insecticides is ineffective. Due to the difficulty in obtaining complete coverage and the potential impacts to natural enemies (which can prolong scale outbreaks), application of these insecticides is generally not recommended.

Trunk injection or soil drench application of systemic insecticides can be effective at reducing scale populations. Trunk injections of imidacloprid should be made in the fall, while acephate should be injected in the spring for maximum efficacy. Soil drench applications should be done in early spring to allow sufficient time for uptake.

**When using pesticides, always read and follow the label**

## Other references:

USFS Forest Health Protection  
[www.fs.usda.gov/goto/fhp/fidls](http://www.fs.usda.gov/goto/fhp/fidls)

OSU Forestry Extension  
<http://extensionweb.forestry.oregonstate.edu/>