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Ministry of
Agriculture

B.C. MINISTRY OF AGRICULTURE, PLANT HEALTH UNIT Dying Cedar Hedges

Dying Cedar Hedges —What Is The Cause?

Attractive and normally trouble free, cedar trees can be great additions to the landscape. Dieback of cedar hedging in the landscape is a common problem. In most cases, it is not possible to pinpoint one single cause. Death is usually the result of a combination of environmental stresses, soil factors and problems originating at planting. Disease, insect or animal injury is a less frequent cause.



Identifying The Host

Certain species of cedar are susceptible to certain problems, so identifying the host plant can help to identify the cause and whether a symptom is an issue of concern or is normal for that plant.

The most common columnar hedging cedars are *Thuja plicata* (Western Red Cedar - native to the West Coast) and *Thuja occidentalis* (American Arborvitae or Eastern White Cedar). Both species are often called arborvitae. Common varieties of Western Red cedar are 'Emerald Giant', 'Excelsa' and 'Atrovirens'. 'Smaragd' and 'Pyramidalis' are common varieties of Eastern White cedar hedging. Species of *Cupressus* (Cypress), *Chamaecyparis nootkatensis* (Yellow Cedar or False Cypress) and *Chamaecyparis lawsoniana* (Port Orford Cedar or lawsom Cypress) are also used in hedging.

Symptoms

The pattern of symptom development/distribution can provide a clue to whether the problem is biotic (infectious) or abiotic (non-infectious). Trees often die out in a group, in one section of the hedge, or at random throughout the hedge. Random distribution is generally an indication of an infectious disorder. If the trees are stunted compared to healthy trees, this is an indication that they have been under stress and declining for several years. It could be abiotic or a combination of abiotic and biotic factors contributing to decline. If damage occurred suddenly with no previous symptoms, it is most likely some change (cultural) or extreme condition (most likely environmental) that occurred recently in the current growing season. If entire trees are dead, this suggests damage to the roots and/or base of the tree. Death or discolouration of individual branches can be due to a disease, insect damage or physiological response to abiotic factors.

Planting Problems

Roots fail to grow out of the root ball sufficiently after planting. Trees that survive the first year after transplanting may remain stunted and decline gradually for several years, until another stress results in tree death. Common causes of root growth failure are :

Desiccation: In hot summer weather, root balls can easily dry out during transport or at the site before the trees are transplanted. This prevents new root growth. When dead trees are dug up, a dry airspace can often be found between the root ball and the side of the planting hole. Plant new hedges in cool weather. Watering thoroughly is key for helping cedars take root after planting. It is important to keep cedars watered during dry weather. A deep thorough watering once or twice a week is better than light, frequent watering. Balled and burlapped plants are more susceptible to desiccation than plants grown in containers since up to 90% of their root system is lost at digging. Minimizing drying of the root ball can prevent tree establishment problems.



Twine and Burlap: Some twine may not disintegrate quickly enough in the soil. If the twine is not removed at planting, it may cut into the stem as it grows, causing decline and death of the tree. Some burlap sacking is treated with copper sulfate (appears blue or green in colour) to prevent rot. If treated burlap is not removed, the copper sulfate can prevent new root growth.

Girdling: If the root ball has become pot-bound in a nursery container and is not cut and spread open at planting, the taproot may grow around the base of the stem and gradually kill the tree.

Soil type, compaction and deep planting: If the soil at the planting site is quite different from the soil in the root ball, new roots may have difficulty growing into it. This is particularly true where the landscape soil has a high clay content or is compacted from construction. In addition, by planting too deep, roots die out from lack of oxygen.

Excess Fertilizer: Adding too much fertilizer can damage roots and cause browning of foliar tips. Lack of fertilizer will also cause tree decline.

Physiological Effects

Cedar Flagging/Browning (Environmental): Foliage takes on an overall brownish or purplish colour in early spring. This colour may change rapidly. Healthy plants will green-up as the season progresses. It is very common on Western Red Cedar and less frequent on Eastern White Cedar. Flagging may be more severe in hot, dry weather but is not harmful to the tree.



Dying tree—Root rot, Flagging or Nutritional?

Discoloured Foliage: Foliage may take on a bronze to reddish brown to black colour in cold winters. This is natural and the trees will green up as the growing season progresses.

A few varieties have a natural bronze or blue tinge in certain seasons. Some cedars appear blue when flowering.

Environmental, Soil and Chemical Factors

Heat: Foliage can become dull or bronzed in mid-summer from heat and desiccating winds.

Water Stress: Cedars are relatively shallow-rooted trees. They are susceptible to drought stress especially on well-drained, sandy soils. The extreme of very wet soil in the fall and winter, followed by a hot, dry summer, is very stressful for the roots. Hedges should be watered regularly during very dry periods. Mulching will help to maintain even soil moisture.

Prolonged flooding and overwatering can also cause root death from lack of oxygen in the root zone. Water can accumulate under hedges that are planted downhill from watered lawns. Excess moisture can encourage root rots caused by water molds.

pH: *Thuja* spp. prefer a soil pH of 6.0 to 6.5, but will grow well in soils up to 7.5. Soils that are too acidic can result in nutrient deficiency symptoms (browning or yellowing of foliage) and eventual tree decline.

Mechanical: Caused by injury to the base of the trees from mowers and trimmers.

Herbicide: Runoff or drift from herbicides may injure cedar hedges. It may take some time for an entire tree to gradually die after exposure to a systemic herbicide, such as ROUNDUP (glyphosate).

Road Salt: Road salt can damage foliage if slush splashes up onto trees. It can also kill roots by accumulating under hedges in snow melt water or runoff. The damage is uniform along the hedge seen in the lower section.

Insect, Disease and Vertebrates

Insects and Mites

Cypress Tip Moth (Leaf miner): Adults (6mm, silvery tan moths) are active in early June. Eggs are inserted into the green tips of one and two year-old twigs. Infested twigs turn yellow, then brown in late winter. White, spun cocoons can be found on leaf scales in early June. Western Red Cedar is not affected.

Mites: Overall yellowing or browning of foliage with speckling may be due to mite infestation. A few mites are usually not a problem, but in hot, dry weather they can build up to damaging levels. Monitor by gently shaking the foliage above a sheet of white paper. Miticides are available for management.

Root Weevils: Adults may girdle twigs a few cm from tips and turn the foliage brown, similar to flagging. Notching of the stem will be

evident below the flagged portion of the branch. Damage can occur from March to July. Larvae may feed on roots and crown causing serious damage on landscape plantings.

Juniper Scale: Juniper scales attack juniper, arborvitae, cedar and cypress. Cones, twigs and needles are attacked. Heavy infestations deplete plant sap resulting in grey or yellow foliage, reduced growth over time and possible death of young branches.

Scales are round to oval, white and 1.5 mm long. Direct management against the newly-hatched crawlers in mid-June.



Root Weevil feeding damage in the crown area

Vertebrates

Mice and Rodents: Chewing injury can often be found on twigs just below dead leaves. Damage is often worse at the base of the tree, but can occur quite high up. Bark can also be chewed or stripped off at the base of the tree. This may cause death of the branches on one side, or, if the trunk is girdled, may kill the tree entirely. Dogs have also been known to chew lower branches and strip bark from trunks.

Dog Urine: Small yellow, brown to black patches of dead foliage at the base of the trees. Dogs generally make an arch urinating on the foliage. Foliage affected by this eventually turns black and dies.



Woodpecker damage—Photo by Becca MacDonald, Sault College, Bugwood.org

Diseases

Root Rot: Armillaria root rot is sometimes found in cedar hedges. Branches turn brown, often starting on one side of the tree. Fans of white fungal mycelium can be found under the bark at the base of dead trees and in the roots. Black 'strings' called rhizomorphs spread the fungus from one tree to another. There is no cure for Armillaria. Rogue out and burn diseased plants taking care to remove all traces of tree roots and fungal 'rhizomorphs' before replanting with resistant species.



Armillaria root rot—white mycelial mats

Phytophthora root rot: *Phytophthora* and *Pythium* species can sometimes be found in dead, rotted roots.

Phytophthora is a weak pathogen on *Thuja*, invading roots that have been damaged by water stress or other factors. Western Red Cedar is resistant to *Phytophthora* root rot but the Eastern White Cedar, especially 'Smaragd', may be somewhat more susceptible.

Cypress and *Chamaecyparis* species can be affected

Foliar Blights

Keithia blight caused by a fungus called *Didymascella thujina*, is the most serious disease of Thuja. Western Red Cedar is quite susceptible, especially 'Excelsa' and 'Atrovirens'. Eastern White Cedar can also be affected. Infected leaf scales show tiny, circular, brown to black, fungal fruiting bodies that appear in late spring. The leaves then turn brown and affected areas fall out. Later infected leaves drop, leaving branches with a sparse or bare appearance. Dormant spores adhering to the foliage in the fall can germinate and cause new infections. In the landscape, the disease can be managed with fungicides if necessary.

Seiridium blight (also known as Berckmann's blight and coryneum canker) associated with the fungus *Seiridium cardinale*, occasionally causes twig and foliar dieback and small twig and branch cankers. Foliage looks greyish and infected twigs dieback. Young twig tips are infected and the disease progresses inward on the tree.

Kabatina thujae affects *Thuja occidentalis* and *Chamaecyparis* spp., and cause leaf and shoot dieback in spring. It is a weak pathogen and its presence indicates that the plant is not growing in optimal conditions.

Pestalotiopsis spp. cause stem and leaf blight. It also grows as a saprophyte on dead material. Black thread like clumps of spores emerge from dark fruiting bodies. It is not considered a serious pathogen in good growing conditions.



Keithia blight (top) and Pestalotiopsis blight (bottom) —Photo by Bruce Watt, Univ. of Maine, Bugwood.org

When you see any of the above symptoms but are not sure of the cause of the problem, have a sample checked by a plant diagnostic laboratory before applying any management tools. Similar symptoms can be produced by different factors, therefore, the correct identification of the cause of the problem is essential to be able to apply appropriate management measures. If the problem is caused by abiotic factors, pesticides are not an option to manage the problem.