Why is my tree dying?

Western redcedar (*Thuja plicata*)

September 2024

Common cause(s): evidence suggests a mix of factors including changing climate
Symptoms: top dieback, flagging, crown thinning, yellowing, whole-tree mortality

Summary

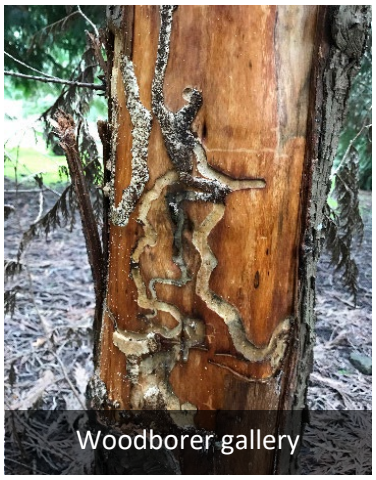
Top-dieback, dying branches, crown thinning and whole-tree death in all ages of western redcedar has been seen recently at lower elevations in the Willamette Valley and beyond. Although it is common to see 'spiked' or dead tops in older western redcedar, usually there are living lateral branches and a functional crown. No single factor has been identified in these more recent die offs, but a mix of poor or unsustainable growing conditions may be to blame. Redcedar may simply be growing in areas or within microclimates outside of their preferred range or areas that are no longer sustainable for long-term growth under current climate conditions.

Patch of dead redcedar

Climate change and drought events increase the intensity and length of high temperatures as well as the amount, frequency and/or consistency of rainfall and snow. Trees have pores (stomata) in their leaves, which open for gas exchange during photosynthesis. Opening these pores causes water vapor loss. The rate of loss depends on vapor pressure deficit which is the difference between moisture levels in the air and when the air is saturated. When it's hot and dry this deficit increases and causes tension in the water columns (vascular tissues), that extend from the leaves to the roots. This is like the tension you get from sucking on a straw. When there is too little moisture, this tension increases. After long or severe droughts, the water columns may eventually break (air gets introduced into the straws). This reduces the ability for a tree to move water to its leaves. More information on drought here: https://www.oregon.gov/odf/Documents/forestbenefits/Drought.pdf

Common pests

Several secondary insects and diseases are known to infest dead or dying western redcedar, although none are typically the primary cause of tree mortality. These common secondary insects include cedar bark beetles (*Phloeosinus* spp.), western cedar borers (*Trachykele blondeli*), amethyst cedar borers (*Semanotus amethystinus*), as well as flathead cedar borers (*Chrysobothris nixa*) which are more often pests of ornamental arborvitae. Rarely do these insect infestations kill trees. Diseases of redcedar are often opportunistic root and butt rot pathogens that degrade wood once the tree has died. Common diseases include pencil rot (*Postia sericeomollis*), red ring rot (*Phellinus pini*), yellow ring rot (*Coniferporia weirii*), armillaria root disease (*Armillaria* spp.) and cedar leaf blight (*Didymascella thujina*). Note, damage from squirrels, porcupines and bears can also cause flagging and topkill due to bark stripping activity.



Woodborer gallery

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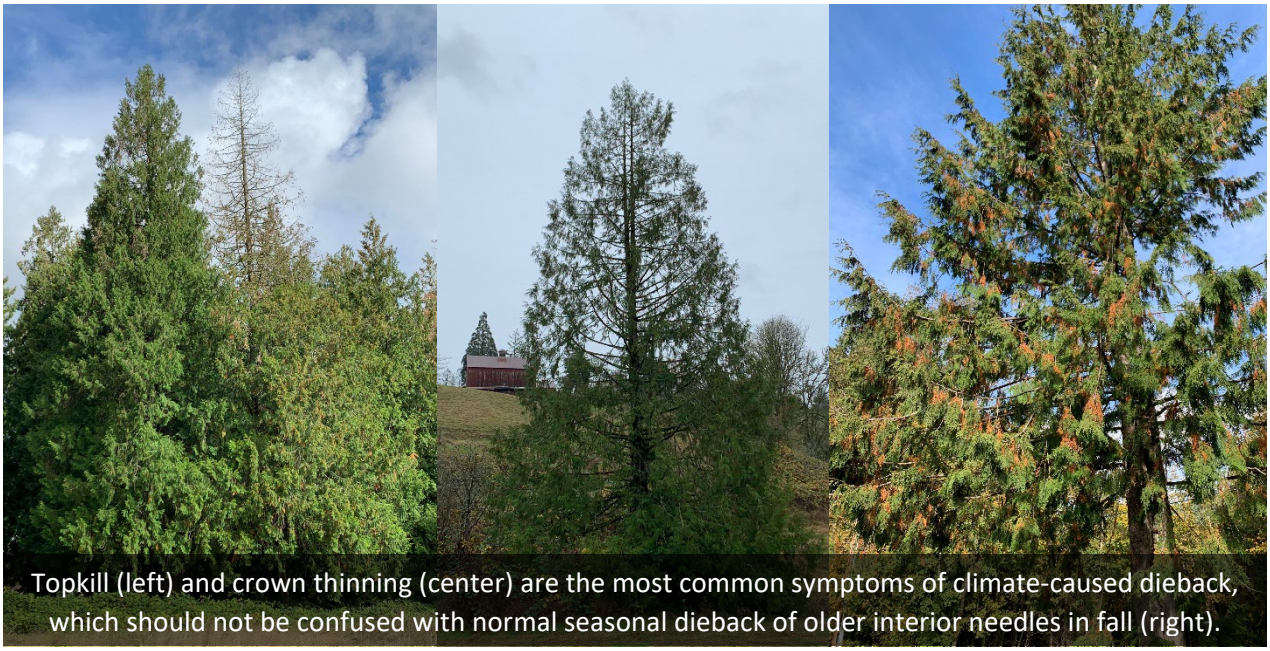
Why am I seeing this now?

Changing climate may be repeatedly stressing trees and/or making some habitats less able to support western redcedar. Most of Oregon has been in a drought since 2012. Climate predictions show greater chances for higher temperatures and lower or inconsistent snow and rainfall. More information here: https://tinyurl.com/WRCStorymap



Topkill (left) and crown thinning (center) are the most common symptoms of climate-caused dieback, which should not be confused with normal seasonal dieback of older interior needles in fall (right).

Where should I grow western redcedar?

Western redcedar is very shade tolerant. Trees can thrive in sunny locations with enough moisture, but they are more at risk during hotter droughts. This species requires moist conditions. It thrives in coastal fog belts and moist inland areas up to about 4,000 feet elevation. It tolerates most types of soils and outcompetes many other species in wet soils. Western redcedar is shallow rooted and may not do well in soil crowded by roots of other plants (including trees) that are competing for water. Alternate species for redcedar include incense cedar, oak, pine, redwood or sequoia in somewhat drier sites, and Douglas-fir, maple, alder, ash or cottonwood at sites that do not dry out in the summer. Supplemental water may be provided for redcedars to get them through the hottest summer months: https://www.oregon.gov/odf/Documents/forestbenefits/fact-sheet-watering-your-trees.pdf

Avoid planting western redcedar in dry, sun-exposed areas such as open yards or as part of landscaping for heat islands, such as parking lots and business parks.