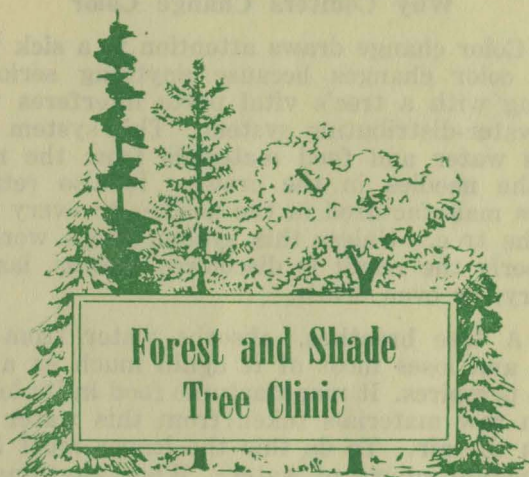




UNIVERSITY of IDAHO  
COLLEGE OF AGRICULTURE

# Red Top Conifers and Why They Turn Red



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# Red Top Con

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**W**HEN A human being becomes ill he may turn pale. On the other hand, if he has a fever he may show a flushed or red face. Human beings and trees have much in common when they are sick. When a tree is injured or becomes ill, it too changes color.

When one of our conifers (softwoods) becomes ill it usually shows red-faced symptoms. Disturbances of various kinds eventually show up in the needles of the crown. They turn yellow, brown, reddish-brown, or red. It makes little difference whether the illness or injury is located in the roots, trunk, or branches. The symptoms in the crown give similar danger signals. A doctor can seldom tell what is wrong with a person if he knows just one symptom. The forest pathologist too must know more than the fact that a tree has turned yellow or red.

## Why Conifers Change Color

Color change draws attention to a sick tree. The color changes because anything seriously wrong with a tree's vital parts interferes with its water-distributing system. This system supplies water and food materials from the roots to the needles in the crown. It also returns foods manufactured in the needles to every part of the tree. Unless this system keeps working properly the result is discolored crowns, lasting injury, or even death.

A tree breathes, absorbs water from the soil, and loses most of it again much as a human perspires. It manufactures food in its leaves from raw materials taken from this water and from the air. To do this the leaves must have a constant supply of water. When anything interferes with this supply the leaves are no longer able to manufacture food. The tree then literally starves. Its normal healthy green color gradually fades. If the water supply is interrupted suddenly, the color change may be fairly rapid. If the interruption develops slowly, the fading of color may take a long time. Then it passes from healthy green to faintly yellowish-green, becoming more yellow as time passes. This turns to pale brownish as the needles dry with advancing death. Finally they turn completely brown. More rapid death often produces

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# fers and Why T

**T**HIS CIRCULAR is one of a series written to help the people of Idaho recognize some of the more common ailments of their forest and shade trees. The series is provided by the College of Forestry of the University of Idaho, cooperating with the Idaho Extension Service. To help you further, a form has been prepared that makes it easy to describe and report trouble with your trees. If you have ailing trees, obtain a copy of this form from your county extension agent. You can also get the form by writing to the Extension Forester, University of Idaho.

a decided red color, and some kinds of trees show brighter red coloration than others. So it is that the turning of the conifer's needles to yellow, brown, or red tells us that the tree is suffering from one or more of several diseases. We know that the tree is sick, dying, or already dead.

We commonly think of disease in terms of those that can be passed from one person to another. They are the "infectious" diseases. In humans they are caused by germs, a familiar term that includes bacteria fungi and viruses. So far, no virus disease has been found affecting conifers in North America.

Insects can also cause Red Top of conifers. In addition, Red Top is caused by some agencies that are not living. Here we must include weather conditions and too much coal smoke or gases from manufacturing plants. Some minerals in the soil, injuries, and ground fire damage are other causes. Let us take a closer look at each of these kinds of disease that can cause Red Top of conifers.

## Infectious Diseases

The infectious diseases we are most likely to see in conifers are almost all caused by fungi. A good example is needle cast of ponderosa pine. It is at this time common and serious in much of central and southern Idaho, mostly above 4000 feet elevation. At first, single branches change color, die and become a red-brown that stands out sharply against the other green branches. These red branches are known as "flags." After midsummer the brightness fades and the flags get harder to see as the season advances. Trees that die usually go by losing a few branches each year.

Several root diseases of conifers cause trees slowly to change color from the top downward.

# They Turn Red

The tip first becomes faintly yellowed, slowly turning more yellow as time passes. When the tip is a decided yellow, branches near the base of the tree may still be a healthy green. Yellowing spreads down, and the tip turns reddish-brown, finally dying. The crown dies gradually downward. This same slow change of color from the top down is found in "pole blight" of white pine. This disease is serious in many areas north of the Clearwater River in Idaho. Its cause is still unknown. Western larch may suddenly turn yellow-brown in the spring and early summer of some years. This is the result of two different diseases. The fungi that cause them attack the needles directly. Many other infectious diseases cause color changes like those described here.

## Insects

Most of the insects that cause Red Top of conifers are beetles that work under the bark. They usually attack trees that are not really healthy. Beetles sometimes become so numerous that they must also feed on healthy trees. These insects break the water-distributing system of a tree by making tunnels that girdle the trunk completely under the bark.

## Weather and Polluted Air

Unusual weather conditions can produce Red Top. Temperatures that are too low or too high may kill parts of the crown, or even kill the tree. Low temperatures in late spring or early fall damage trees in most parts of Idaho every few years. Rainfall that is below normal produces drought conditions that are familiar to everyone. Conifers used as ornamentals often suffer from too little water. This is particularly true in parts of the state where trees did not grow before the white man came. Most irrigated areas had no forest in those times, for the rainfall is too low to grow our native trees. Where irrigation is needed for crops, conifers almost always need more water than rainfall provides. On the other hand, trees in slightly lower and wetter parts of irrigated land may get too much water. Any of these conditions can produce changes of color that indicate a sick tree.

We have all heard of "polluted" water. Because of its effect on fishing, sportsmen across the country take a strong stand against water

pollution. We can have air pollution too, and it can kill trees and crop plants as well. This is rarely a problem in areas that are not close to a manufacturing center. Near such centers, too much coal smoke or gases from some kinds of manufacturing plants may be a serious problem. These fumes contain materials capable of killing plants. Trees, shrubs and crop plants often die over wide areas.

### **Minerals**

Like all other plants, trees need minerals from the soil. These are taken up dissolved in the water used by the tree. Some soils cannot supply enough of some minerals, while others supply too much of certain kinds. Whether it is too little or too much, discoloration of the leaves is usually the result. This often ends in Red Top as the tree dies. The common chlorosis is a disease of this type. It is usually called "lime-induced chlorosis" and it is found in much of southern Idaho. It can affect trees as well as crop plants. It often shows up in conifers.

Mixtures containing a lot of borax are used to kill weeds along highways. They are usually used around guard rails where a mowing machine cannot do a good job. Trees near such places often show a great deal of browned needles. This is the result of too much borax carried to their roots by seeping rainwater. The discoloration has become known as "guard rail disease" in certain parts of the country. Other weed killers can produce much the same result if used carelessly or too heavily near trees.

### **Injury and Fire**

Any injury that takes off large areas of bark from the trunk of a tree can cause part of the crown to change color and die. If the injury takes off a complete band of bark all around the trunk, leaving the wood showing, the tree will die. Loss of bark directly interferes with the tree's water-distributing system. This is because the system is located in the outer wood and inner bark.

Fire running along the ground can kill many kinds of trees. They have thin bark that provides poor insulation. This lets the fire overheat the growing region of the tree just under the bark. Trees with thick bark can escape this kind of injury. An example may be found in the ponderosa pine forests of Idaho. In these forests grass fires were very common before our present fire-control methods were developed. Douglas-fir ("red" fir) seedlings were killed by

these fires before they got established. Their bark is too thin to resist very much heat. Ponderosa pine has thicker bark and can survive the heat much better. This explains why the older forests in ponderosa areas were almost pure ponderosa pine.

Conifers may shed their oldest needles in the fall. These needles have outlived their usefulness and are ready to be dropped. This is perfectly normal and is no indication of disease. Western redcedar, western white pine and ponderosa pine often show many dead needles late in the season. Their loss in the fall is actually helpful. During the winter where the soil is frozen, water cannot be taken up by the roots. Without these needles the tree will not lose so much moisture in this period of water shortage.

Everything that kills trees causes a reddish-brown or at least a discolored crown in the last stages as death approaches. This is most confusing to those who have the job of keeping our trees healthy. However, as some of the few examples given will show, discoloration that has not gone quite this far can be helpful. The early yellowing of chlorosis, and early changes of color caused by shortage of minerals are useful aids. Discoloration or even death of single branches often appears early enough to be of real help. The chief service these discolorations can perform is to draw attention to a sick tree. We have seen that many diseases can produce Red Top. This shows that we must know more details than the change of color to discover the cause.

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