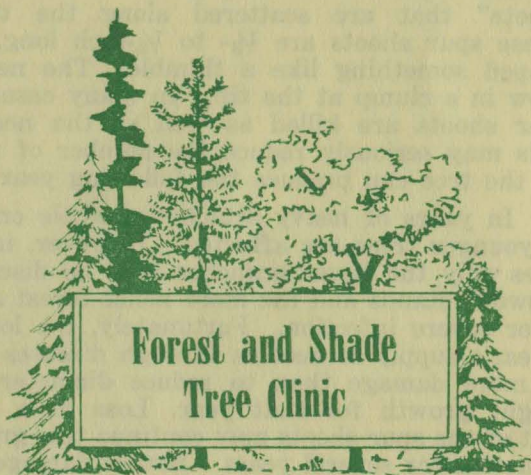




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COLLEGE OF AGRICULTURE

# Needle Cast Diseases of Western Larch



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# NEEDLE CAST

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**I**N CERTAIN years, the fresh green forest color of early spring in northern and central Idaho is suddenly browned. On closer view these browned areas are found to be groups and individual trees of western larch (tamarack). They are suffering from a disease that kills the young needles. By midsummer, the stand may have only a slight greenish color. The general effect is a scorched appearance; a red-brown cast as though fire had killed the needles. These attacks occur in certain years in which weather and other factors are favorable. Then the parasitic fungi that cause the trouble are able to attack the new needles.

Larch is our only conifer that sheds its needles each year. In the fall the tree turns a brilliant yellow as the needles die. This is perfectly normal and must not be confused with disease. In the spring a complete new supply of needles is produced. They grow on short "spur shoots" that are scattered along the twigs. These spur shoots are  $\frac{1}{8}$ - to  $\frac{1}{4}$ -inch long, and shaped something like a thimble. The needles grow in a clump at the tip. In many cases the spur shoots are killed as well as the needles. This may seriously reduce the number of needles the tree can produce the following year.

In years of heavy attack the whole crowns of younger trees are affected. However, in tall trees only the lower branches may be diseased. Crowded stands and the more moist forest areas favor severe infection. Fortunately, the loss of a year's supply of needles through diseases does no more damage than to reduce diameter and height growth for that year. Loss of a large part of the spur shoots may continue this growth reduction for several years. Severe damage and even death may result if heavy loss of needles occurs for more than two years in succession. If more of the spur shoots are killed along with these needles, damage is more certain and faster.

The problem known as "larch needle cast" includes two distinct diseases caused by different fungi. The general name "needle cast" is applied to diseases of conifers in this country caused by more than forty different fungi. Diseased needles drop off after death. In some cases the needles fall in the same season they are infected. In others they remain in place until the following

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# DISEASES OF WE

year. The two needle cast diseases of larch include one of each type.

## Hypodermella Needle Cast of Larch

The most common and striking of the larch needle casts is caused by a fungus that has no common name. Its scientific name is *Hypodermella laricis*. The disease caused by this fungus causes the killed needles to cling to the spur shoots until the following year. Needles become infected in early spring when they are very young. Suddenly almost all infected needles begin to turn brown at once. This occurs not long after they have grown to their full length. When infection is heavy this sudden change is so obvious and dramatic that people often believe the whole forest is dying.

Through late spring and early summer tiny black spots appear on the upper side of the dead needles. These are the "fruiting bodies" of the fungus that causes the disease. They are dull black and roughly oval when they are not run together. They are rounded up in the middle, shaped something like half of an apricot or plum pit. A straight split appears down the center. When the separate fruiting bodies run together in lines this split often seems to run the full length. It must be remembered that these bodies are small, and details must be seen through a fairly strong magnifier. However, they are clearly visible on the dead needles with the naked eye if you look closely.

The fruiting bodies serve to reproduce the fungus parasite. In the wet weather of early spring they swell, opening the split along the top. From the exposed interior millions of microscopic "spores" are shot into the air. They are carried by wind or by splashing rain to nearby new needles. There they attach themselves by a sticky coating. They send out a slender thread that grows into the needle, and infection has begun. These spores serve the same pur-

**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 for you 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.

# STERN LARCH

pose as the seeds of higher plants, but they are much simpler structures. They should not, therefore, be called seeds.

After the normal autumn leaf-fall removes the healthy needles, clumps of dead, diseased needles remain through the winter. A heavily infected tree may keep many thousands of dead needle clumps. This may even give the impression that the tree is dead.

These dead needle clumps stand out sharply in contrast to the new needles in the spring. They are also clearly seen through the summer months, even in a tree with fairly light infection. Their light brown or pale reddish-brown color shows up against the green of the healthy needles. When infection is heavy a young stand seen from a distance may look almost completely brown with hardly a tinge of green.

This disease has not been closely studied because it seldom has caused loss of valuable timber. It can be found on at least a few trees every year. When it flares up every so many years the reason is almost certainly the occurrence of spring weather favorable to the fungus.

## Meria Needle Cast of Larch

The second of the two diseases known as larch needle cast is also caused by a fungus that has no common name. Its scientific name is *Meria laricis*. The first report of this disease in North America came from Idaho in 1942 when Dr. John Ehrlich of the University's School of Forestry recognized it. It is not known whether the fungus that causes it was introduced from Europe, or whether it was simply overlooked earlier. It is probable that the fungus had been overlooked for the disease it causes is easily confused with the one just described.

In Idaho, trees of all ages have been found attacked by *Meria laricis*. This fungus begins its attack on the young needles in the spring. Spores are released from the dead needles of the past year that are lying on the ground. In the late spring the infected needles first turn yellow, then gradually become brown. For a time the discolored crowns remain in sharp contrast to the surrounding green trees. Later the dead needles are cast before the normal leaf-fall in the autumn. Some dead needles may fall as early as July, but they usually stay in place until one or two months before the healthy needles are shed.

Infection of needles continues through the

whole growing season in this disease. On tall trees most infection may be found on the lower branches. This is because the lower branches are closer to the ground where the spores are released from the past season's dead needles.

This disease is not so spectacular in producing a sudden change of color of the forest as the one caused by *Hypodermella laricis*. The change is more gradual and extends over a longer period. All killed needles are not brown at the same time. This is because infection continues and dead needles continue to be shed through the summer. *Meria laricis* does not kill the short shoots, growing in the needles only.

The fungus cannot be seen on the killed needles without the aid of a microscope. This gives us the opportunity to tell which of the two diseases is affecting a tree, if there are dead needles still in place. The tiny black fruiting bodies of *Hypodermella laricis* should be seen on needles it has killed at any time after mid-June, and often earlier. Where no fruiting bodies can be seen at this time or later, *Meria laricis* is probably responsible. If dead needles stay on through fall and winter, you may be sure the *Hypodermella* is the cause of the disease.

*Meria* Needle Cast is often serious in forest nurseries of Europe where European larch is widely grown in forest plantations. It has also caused damage in young plantations. In Idaho it has been reported killing "a considerable amount of reproduction". This term includes young trees from seedling size to thirty or forty years old. There has been no close study of damage caused here by either of these two needle cast diseases. This is because larch has been given little attention by foresters, who have directed most study to trees of greater value commercially. Most foresters believe that these diseases cause very little financial loss to forest owners.

### Control

No control measures for the larch needle casts are practicable under forest conditions today. The value of larch is not high enough to justify the expense that would be necessary. In European nurseries the disease caused by *Meria laricis* has been controlled by spraying with the well-known lime sulphur mixture. Almost no larch is grown in forest nurseries in Idaho, so the problem has not arisen here. Spraying of ornamentals will give control, but its advisability must be decided by the owner. It should not be considered unless a tree is in actual danger as a result of repeated infection.

A well-established larch can easily stand occasional loss of almost all needles.

Nursery practice in England uses lime-sulphur in the following spray schedule to control *Meria laricis*: First spray early in March, again early in April. Repeat at two- or three-week intervals until settled dry weather sets in, or until the end of July. Wet all needles thoroughly. Use the following spray formula:

Lime-sulphur 1% .....	1 gallon
Water .....	100 gallons

You are warned that lime-sulphur will discolor house paint, turning it yellow. Work when there is no wind to carry the spray to painted surfaces.

No spray schedule has been developed for *Hypodermella laricis*. However, it is almost certain that this fungus can be controlled by use of the lime-sulphur spray suggested for *Meria laricis*. Several investigators have suggested 4-4-50 Bordeaux Mixture (proportion of copper sulphate, lime, water, in that order) for control of needle cast fungi in general. A number of commercial spray formulas that also use copper are available at local gardeners' supply stores. These should prove effective and are much simpler to prepare than the standard Bordeaux Mixture.

Whatever the spray material used, time of spraying will be different from the schedule used against *Meria laricis*. It is suggested that only three sprayings should be necessary, as follows:

1. When the new needles have just begun to appear.
2. When the needles are about half-grown.
3. When the needles have reached almost full length.

This gives protection through the period when the fungous parasite produces its spores.

It must be emphasized that it is not possible to predict the years in which these two needle cast diseases may be serious. If this were possible, spraying could be limited to those years. Without such knowledge we must do the job every year where protection is necessary. The owner must decide whether there is risk of loss of his trees, and whether the risk makes his effort worthwhile.

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS, UNIVERSITY OF IDAHO, COLLEGE OF AGRICULTURE, AND UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

D. R. THEOPHILUS, Director

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