Insect and Disease Management Series 15.2

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Management Guide for

Larch Needle Cast

Meria laricis Vuillemin

- Western larch trees of all ages and sizes are infected
- This fungus has rarely been seen on alpine larch

Topics

Key Points

- Impact in a forest is rarely as significant in the long term as it appears during an outbreak.
- Select for resistance during precommercial thinning.
- Select resistant seed trees.
- Protect ornamentals and nursery stock with well-timed fungicide treatments.

Larch needle cast and blight team up

Meria laricis is favored by frequent rainfall from early leaf development continuing throughout the summer. In forests, *Meria* occurs commonly, though not always, in conjunction with *Hypodermella laricis* (a needle blight fungus). Both fungi are favored by spring rains. The two pathogens are easily distinguished by the appearance of infected needles and by their fruiting bodies.

Growth loss resulting from severe infection is probably the greatest effect. The combined effects of *Meria* and *Hypodermella* may have considerably greater impact than the effects of either fungus alone. The needle blight fungus defoliates the tree only once, shortly after bud break, and the tree refoliates. *Meria laricis*, however, is capable of almost continuous reinfection of foliage throughout the growing season, as long as periodic rainfall occurs. In years with wet spring weather followed by periodic rainfall throughout the summer, few needles may escape infection by one or the other pathogen.

Unlike *Hypodermella*, *Meria laricis* does not produce perennial infections. Needles shed the previous season or the few tufts of unshed, infected needles on branch tips provide inoculum from one year to the next.

Nursery impacts are most significant

Meria laricis is particularly troublesome in nursery settings. Losses in the form of direct mortality and, most commonly, culling due to reduced caliper, make *Meria* one of the most significant disease problems of western larch in nurseries.

The disease is usually detected in bareroot seedlings in their second growing season. Once present in a nursery, the disease usually persists.

Control Strategies

In Nurseries and Ornamentals

Foliar fungicide sprays have been used successfully and routinely to control *Meria* needle cast.

In nurseries, foliar fungicides are routinely applied to control *Meria*.

- Rogueing larch from the area surrounding a nursery may reduce infection.
- Control is rarely warranted before the second year, and generally, only in bareroot stock.
- Spray schedules vary by location, weather and timing of bud break.
- Generally speaking, the first application should occur as the buds begin to expand and the green tips of leaves become visible in the early spring. Subsequent applications will follow to provide continuous protection (about every 2-3 weeks) until dry weather prevails or until the end of July.
- If overhead irrigation wets leaves throughout the growing season, protection will be required through the end of July.
- Chlorothalonil, generally under the trade name Bravo®, is commonly used to control needle diseases on ornamentals and in nurseries. **Always follow label instructions carefully when using chemicals.**
- In some locations, several years of consistent control of *Meria* may render a nursery free of the disease for a time. Fungicide treatment may be suspended until evidence of the needle spots reappear.

In forest settings, genetic resistance offers the best control.

In Forest Settings

Silvicultural controls are recommended, emphasizing enhancement of natural resistance of some larch trees to infection by *Meria laricis*. Management of *M. laricis* and *H. laricis* should be considered together. There may be considerable variation in susceptibility to both fungi. Some larch in every stand have notably less infection by either or both fungi.

- Realize that longterm impacts in a forest are rarely as significant as defoliation by needle casts and blights appear during an outbreak.
- Thin to minimize lateral competition and maintain optimum growth of larch.
- Select for resistance during precommercial thinning. To some extent this will happen by default when the better-growing trees are selected as leave-trees.
- Select apparently resistant seed trees.

Continuous re-infection

***Meria laricis* is capable of almost continuous reinfection of foliage throughout the growing season.**

As periodic rainfall occurs, infection levels increase.

Life History

Sources of inoculum in the spring are infected leaves on the ground and tufts of infected needles on the terminal shoots of seedlings. Spores are carried by wind and splashing rain to the newly emerged leaves.

Spores are produced on simple fruiting structures called conidiophores which protrude in groups through stomatal openings (Figure 1). Conidiophores can be seen by using a hand lens and appear as rows of small white dots on the undersides of leaves.

While rain aids in the dispersal and germination of spores, it is apparently not a requirement for spore production or release (Peace 1962). Infection generally occurs at the tip or midportions of developing leaves, probably because young leaf tissue is more resistant to infection (Peace 1933).

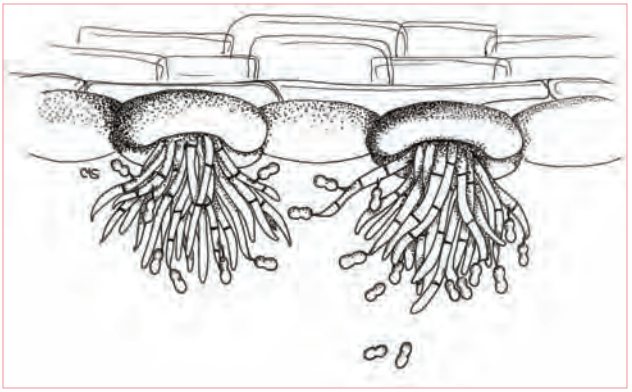
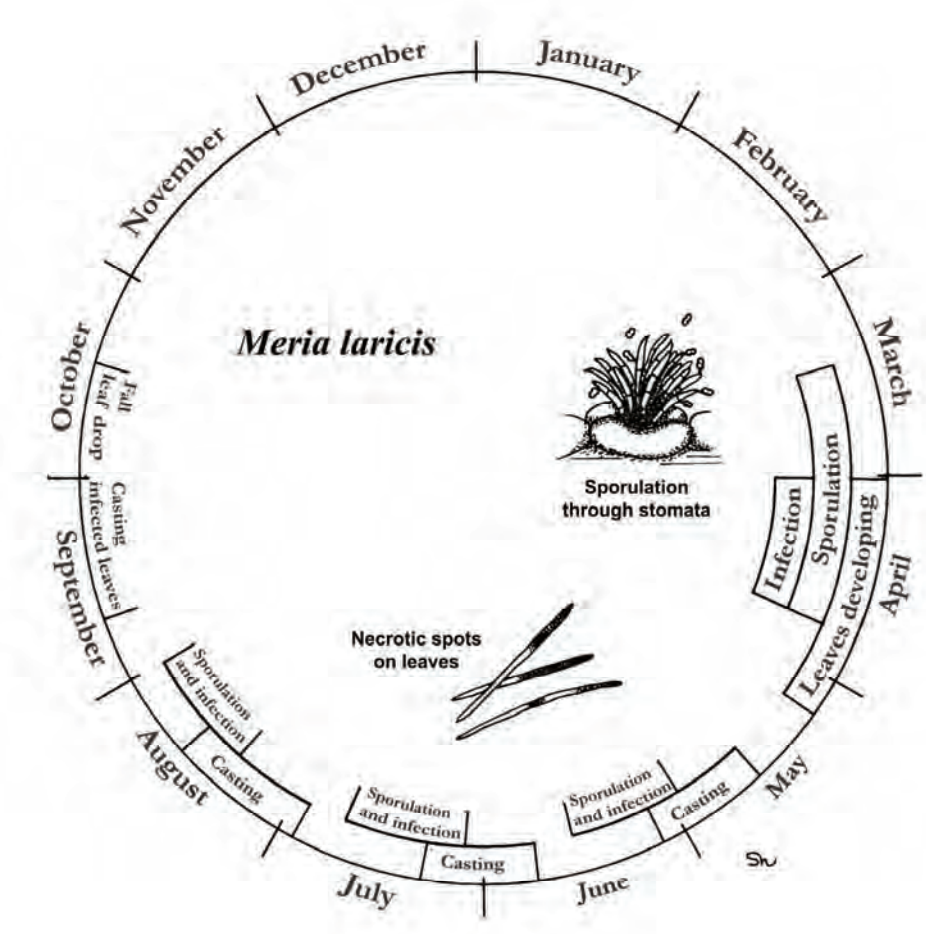


Figure 1. Meria laricis is a hyphomycete of the family Tuberculariaceae. This drawing illustrates clusters of conidiophores emerging through two stomata on the underside of a leaf. The peanut-shaped spores are released to be carried by wind or splashing rain.

Figure 2. Life cycle of Meria laricis



The cycle from infection, to leaf cast, to sporulation and reinfection may take only 2 to 4 weeks, depending on temperature and rainfall.

Meria laricis reproduces asexually in Europe and North America. It is not known to produce sexual sporulating structures, but may have once been capable of producing Rhabdocline-type sexual structures.

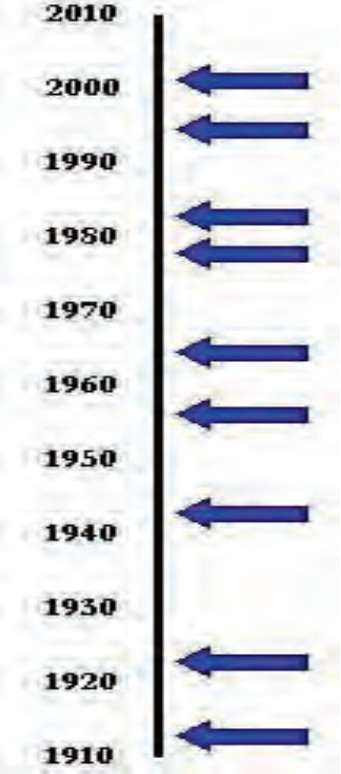
Based on analyses of the nucleotide sequences from the internal transcribed spacer region of _M. laricis_, this fungus appears to be closely related to other fungi which produce Rhabdocline fruiting structures (Gernandt and others 1989).

Life History *(continued)*

After infection, the fungus grows toward the base of the leaf. In early May, yellowing and withering of infected needle tips is noticeable. Leaves eventually turn brown and are cast. Early in the spring most symptoms on long shoots will be in leaves near the base of shoots because it takes some time for symptoms to develop (Peace 1933)

Spores are produced on newly cast leaves and reinfect previously uninfected leaves. The cycle from infection to sporulation (spore production) requires approximately two to four weeks. If favorable moisture and temperature conditions prevail throughout the summer, the inoculum load of *Meria* continues to increase and resulting damage escalates.

Most tree growth should be complete by August and the effects of infection at that point would be minimal.



Significant outbreaks of larch needle cast and needle blight in Idaho and Montana.

A History of Epidemics

Meria laricis was first reported on western larch in the United States in 1942 (Ehrlich 1942). It had been well-known in European larch and plantations of western larch in Europe. The disease was probably not a new arrival in western North America but had been previously overlooked due to its close occurrence with *Hypodermella laricis*, a more readily recognizable fungus.

Epidemics of *Hypodermella laricis*, usually with *Meria laricis*, in western larch in the U.S. have been reported about every 10 years. (See sidebar at left.)

In 1912 and 1913 a severe outbreak of larch needle disease occurred in Idaho and Montana. 1922 was, again, a culmination of about five years of heavy infection in Idaho and Montana. Severe infections were seen in Idaho in 1941 and 1942. In Montana, 1956 was a heavy infection year. A 1978 epidemic in northern Idaho was reported to have been primarily *Meria*. Aerial survey in Idaho and Montana also detected severe infections in 1980, 1981, 1993 and 2002-2003 (USDA Forest Service).

Other Reading

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Forest Health Protection and State Forestry Organizations

Assistance on State And Private Lands	Assistance on Federal Lands
Montana: (406) 542-4300	US Forest Service Region One Missoula: (406) 329-3605 Coeur d'Alene: (208) 765-7342
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Nevada: (775) 684-2513	
Wyoming: (307) 777-5659	US Forest Service Region Four Ogden: (801) 476-9720 Boise: (208) 373-4227

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Available from USDA Forest Service, Idaho Department of Lands, and Montana Department of Natural Resources.