

7. Larch Needle Cast

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Revised from chapter by Sally J. Campbell, 1989.

Hosts

Larch needle cast, caused by the fungus *Meria laricis*, affects many larch species, including western, European, Japanese, hybrid, and Siberian larches.

Distribution

The disease is widespread in North American forests. It is common on nursery stock in the Northwestern United States and Western Canada.

Damage

Severe infection by *M. laricis*, where virtually every needle is killed, will result in seedling mortality. If infection is relatively light, most seedlings will survive; however, seedling growth will be reduced and many seedlings may need to be culled. In the Northwest, good field survival has been obtained for seedlings that were moderately-to-severely infected in the nursery. The most severe damage occurs where larch seedlings are grown in one place for 2 or more years.

Diagnosis

As soon as buds break and needles have expanded, look for yellow to brown spots on needles. Infection usually moves from the needle tip toward the base. The entire needle will turn yellow, then red-brown, sometimes rapidly, and fall prematurely. Needles closer to the ground will be infected first and most heavily (fig. 7.1). Cushion-like tufts of spores emerge through the stomata on the lower surface and occasionally on the upper surface of infected needles. These structures may be visible with a hand lens as white dots, but are more reliably identified by staining the sample and

examining it under a microscope (fig. 7.2). The individual spores are transparent, one-celled, peanut-shaped, and 9 to 13 by 3 to 4 microns in size. Fallen needles should also be examined for the fruiting bodies.

Diseased seedlings may occur in small patches or may be scattered throughout the nursery seedbed. Symptoms may become evident very suddenly during or after wet weather. The disease



Figure 7.1—Lower needles of bareroot larch seedlings affected by larch needle cast. Photo by Sally J. Campbell, USDA Forest Service.

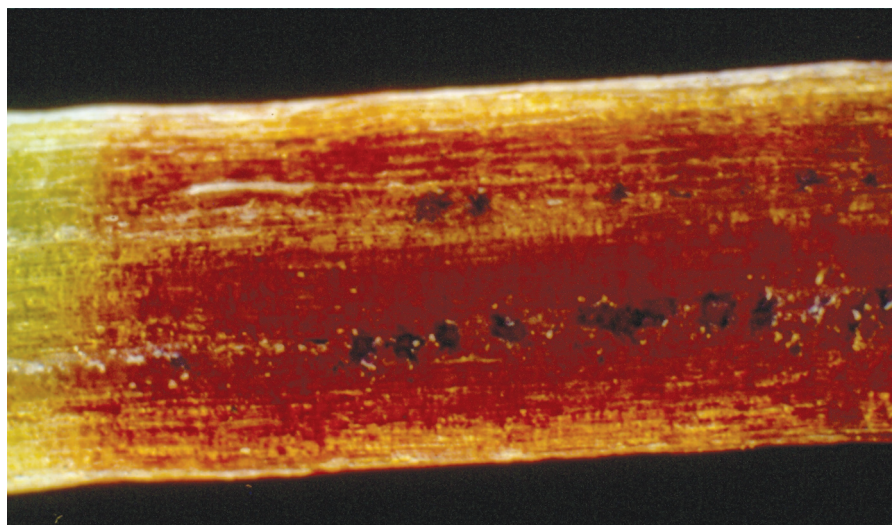


Figure 7.2—Stained fruiting bodies of *Meria laricis* on a western larch needle. Photo by Sally J. Campbell, USDA Forest Service.

is sometimes confused with frost damage. In bareroot nurseries, larch needle cast is most noticeable and severe on seedlings 1 year old or older (fig. 7.3); however, disease symptoms may sometimes be observed in the fall of the first growing season. The disease has also been observed in containerized nursery stock (fig. 7.4), where the symptoms appear from middle to late summer.

Biology

The fungus overwinters, presumably as spores or mycelium, on fallen needles or in the dead terminal needles retained by trees or seedlings. Initial infection may occur as soon as buds break and needles have expanded in the early spring. On 1-0 seedlings, infection most likely originates from spores produced on adjacent 2-0 seedlings or on infected larch in the vicinity of the nursery. Infection on 2-0 seedlings originates from infected needles



Figure 7.3—Western larch seedlings severely affected by larch needle cast. Photo by Sally J. Campbell, USDA Forest Service.



Figure 7.4—Containerized larch seedlings affected by larch needle cast. Photo ©Her Majesty the Queen in right of Canada, Natural Resources Canada, Canadian Forest Service.

shed the previous winter. Fungal fruiting bodies and conidia are produced after infection; the process of infection and production of conidia continues throughout the spring and summer, provided that weather conditions are favorable. To develop, the fungus needs high humidity and cool to moderate temperatures. Wet spring weather favors disease development. Further infections are halted by hot, dry weather. Infection can also occur in the winter, but symptom development is slow.

Control

Prevention

To avoid introducing the fungus into disease-free nurseries, grow all larch from seed rather than importing stock from other nurseries. Rotate larch seedbeds so that seedlings are not grown in the same sections for consecutive years and 1-0 seedlings are not grown adjacent to

2-0 seedlings or transplants. To reduce inoculum, remove larch trees adjacent to nurseries; replace larch with other species. Transplant 1-year-old seedlings to a different part of the nursery to avoid reinfesting them with the fungus that overwintered in fallen needles. In nurseries where the disease occurs, reduce irrigation as much as possible and irrigate early in the day to promote rapid drying of foliage. In container nurseries, thoroughly sanitize growing areas between crops. In bareroot nurseries, plowing under diseased needles may reduce the level of inoculum. Since most infection occurs on 1-year-old or older seedlings, outplant 1-year-old seedlings whenever possible.

Chemical

Fungicides have not provided consistent protection against larch needle cast, probably because it is difficult to cover all needle surfaces. To maximize

7. Larch Needle Cast

effectiveness, protective fungicides should be applied at bud swell, a second time 4 weeks later, and subsequently at 2- to 3-week intervals throughout most of the growing season. Additional applications may be needed during extended periods of rain or irrigation. Continue treatments until overhead irrigation is no longer needed or hot, dry weather predominates. Fungicides are usually not needed on 1-0 seedlings unless they are scheduled for 2-0 seedlings.

Selected References

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