10. Larch Needle Cast

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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; seedling growth will be reduced, however, and many seedlings may need to be culled. In the Northwest, good field survival of seedlings moderately to severely infected in the nursery has been obtained.

Diagnosis

As soon as buds break and needles have expanded, look for brown spots on needles. Infection usually moves from the tip of the needle toward the base. Eventually, the entire needle will turn brown and fall prematurely. The needles closer to the ground will be infected first and most heavily (fig. 10-1).

Cushion-like masses of conidiophores emerge through the stomata on the lower surface and occasionally on the upper surface of infected needles. But the conidiophores are difficult to detect without staining and magnification (fig. 10-2). The conidia are hyaline, one-celled, peanut-shaped and 9-13 x 3-4 microns in size (fig. 10-3).

Figure 10-1—Lower needles of larch seedlings affected by larch needle cast.

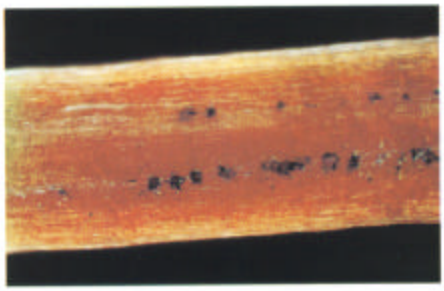

Figure 10-2—Stained fruiting bodies of *M. laricis* on western larch needle.

Figure 10-3—Conidiophores and peanut-shaped conidia of *M. laricis.* (From Peace 1933.)

Diseased seedlings may occur in small patches or may be scattered throughout the nursery seedbed. In bareroot nurseries, larch needle cast is most noticeable and severe on seedlings 1 year old or older (fig. 10-4); however, disease symptoms may sometimes be observed in the fall of the first growing season.

In Idaho and British Columbia, the disease has also been observed in containerized nursery stock. The symptoms appear from mid- to late summer.

Biology

The fungus overwinters, presumably as spores or mycelium, on fallen needles or on 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

Figure 10-4—Two-year-old western larch seedlings severely affected by larch needle cast.

originates from infected needles shed the previous winter.

Fruiting bodies and conidia of the fungus are produced after infection; the process of infection and production of conidia continues throughout the spring and summer, provided weather conditions are favorable. To develop, the fungus needs high humidity and cool to moderate temperatures. Further infections are halted by hot, dry weather.

Infection can also occur in the winter, but development of symptoms 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 reinfecting the seedlings with the fungus that has overwintered in fallen needles.

Cultural—Since most infection occurs on 1-year old or older seedlings, outplant 1-year-old seedlings whenever possible. To have seedlings ready to outplant in 1 year, grow them at lower densities, sow in the fall, or grow in bedhouses (bare-root) or greenhouses (container).

Chemical—Fungicides have not provided consistent protection—probably because it is difficult to cover all the surface of the needles. Benomyl, chlorothalonil, maneb, and sulfur (both colloidal or wettable formulations) have all shown variable effectiveness.

Apply these protective fungicides at bud swell, a second time 4 weeks later, and subsequently at 2to 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 and hot, dry weather predominates.

Fungicides are usually not needed on 1-0 seedlings unless they are scheduled for 2-0 seedlings.

Selected References

Hubert, E.E. 1954. Needle cast diseases of western larch. Bull. 215. Moscow, ID: University of Idaho Agricultural Experiment Station and Cooperative Extension Service. 6 p.

Peace, T. 1962. Pathology of trees and shrubs. Oxford, England: Clarendon Press. 753 p.

Peace, T.; Holmes, C. 1933. Meria laricis, the leaf cast disease of larch. Oxford, England: Clarendon Press. 29 p.