



Disease centre, Pinus sp.

Image: USDA Forest Service - Forest Health Protection Intermountain Region - Ogden, UT , USDA Forest Service, Bugwood.org

Black-stain root disease

Black-stain root disease (BSRD) is a vascular wilt disease of conifers caused by the fungus *Leptographium wagneri*. This disease is not present in New Zealand. Help us keep BSRD from establishing here by learning what to look for.



Image: William Jacobi, Colorado State University

Root section of Pinus sp. showing typical staining pattern.

BSRD is restricted to North America. Increasing disturbance in the natural environment of its hosts has increased the severity of this disease. This disease is not present in New Zealand and we need to be vigilant to ensure it does not establish here.

Symptoms to look for

- Thinning of the crown and eventual chlorosis and stunting of new needle growth in the remaining foliage.
- Black to dark brown staining progresses from the roots to the root collar. Basal resinosis is common.
- Staining follows the annual growth rings in the wood, giving an arc-pattern in cross sections, and columns of stain longitudinally.
- Disease centres, made of small groups of dead, symptomatic and healthy trees are typical.

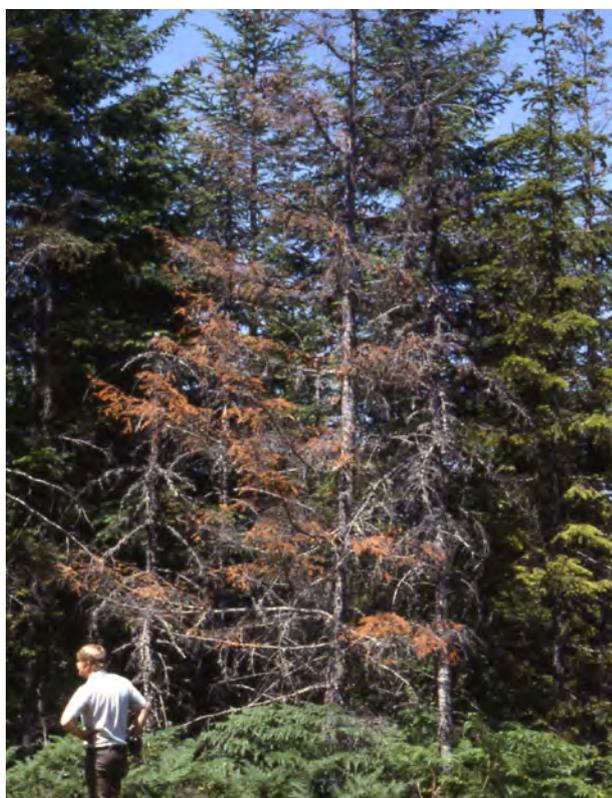


Image: Everett-Hansen, Oregon State University

Disease centre in Douglas fir.



Image: William Jacobi, Colorado State University

Columns of staining in *Pinus sp.* extending up from the roots.

Hosts

This pathogen has been separated into three host-specialised morphological variants; *L. wagneri* var. *wagneri* on *Pinus edulis* and *P. monophylla*; *L. wagneri* var. *ponderosum* on *P. ponderosa*, *P. jeffreyi* and *P. contorta*, and *L. wagneri* var. *pseudotsugae* on *Pseudotsuga menziesii* (Douglas-fir). *Picea* and *Tsuga* species have also been recorded as hosts.

Disease development and spread

- BSRD is spread via insect vectors, predominantly bark beetles that attack stressed trees.
- The pathogen is also spread through root to root contact or grafts.
- The pathogen has also been shown to grow through soil for short distances. Infection also takes place through minor wounds in the fine roots.
- Tree death is a result of tracheid (vascular cells) occlusion by hyphae and the host's reaction, which causes typical wilt symptoms.

Identification and testing

Scion's Forest Health Reference Laboratory (FHRL) has the capability to detect the host-specialised morphological variants of *L. wagneri* by using morphological and molecular techniques.

As required by the Biosecurity Act (1993), if you suspect that you have typical BSRD symptoms, call "Biosecurity New Zealand Pest and Disease hotline - 0800 80 99 66". MPI will coordinate how best to proceed with sampling and identification.

Contact information

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About Scion

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