Scientific Name:
*Leptographium wagenerii* (W.B. Kendr.) M.J. Wingf.
Ascomycetes

Common Name
Black-Stain Root Disease

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2. Species Information

2.1. Details

**Specimen Contact:** Dr Jose R. Liberato - jose.liberato@nt.gov.au  
**Author:** Liberato JR & Hansen EM  
**Citation:** Liberato JR & Hansen EM (2006) Black-Stain Root Disease (*Leptographium wageneri*) Updated on 7/28/2016 Available online: PaDIL - http://www.padil.gov.au  
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2.2. URL


2.3. Facets

**Status:** Exotic Regulated Pest - absent from Australia  
**Group:** Fungi  
**Commodity Overview:** Forestry  
**Commodity Type:** Timber  
**Distribution:** USA and Canada

2.4. Other Names

*Ceratocystis wageneri* Goheen & F.W. Cobb (teleomorph)  
*Leptographium wageneri var. ponderosum* (T.C. Harr. & F.W. Cobb) T.C. Harr. & F.W. Cobb  
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*Ophiostoma wageneri* (Goheen & F.W. Cobb) T.C. Harr. (teleomorph)  
*Ophiostoma wageneri* (Goheen & F.W. Cobb) T.C. Harr. (teleomorph)  
*Verticicladiella wageneri* W.B. Kendr.  
*Verticicladiella wageneri* W.B. Kendr.  
*Verticicladiella wageneri var. ponderosa* T.C. Harr. & F.W. Cobb  
*Verticicladiella wageneri var. ponderosa* Goheen & F.W. Cobb (teleomorph)

2.5. Diagnostic Notes

**Symptoms**

*L. wageneri* infect the roots and may kill the tree in a few years. Symptoms above the ground resemble those of other root diseases: reduction of growth, thinning of the foliage and leaf chlorosis. A characteristic symptom is a dark brown to black stain in the sapwood of roots, root crown and the lower stem (Smith 1967). Bark beetles often are involved in actually killing disease-weakened trees (Goheen & Cobb Jr 1978).

The fungus:

Conidiophores up to 775 µm long and 4—12 µm wide at the base, up yo 12-septate, mid- to dark brown. Sporogenous apparatus up to 175 µm in length, with mostly 3—5 primary metulae developing in a slightly divergent cluster at the apex of the stipe, measuring 20—50 x 4.5—8 µm. Above the primary metulae are 2-4 further series of metulae, which are usually hyaline and thin-walled. Sympodulae up to 400, 9.4-28 long and
1.7 µm at the base, with scars. Conidia obovoid, elliptical or clavate, truncate at the base, smooth-walled, 2.6-7.6 x 1.7-3.8 µm, embedded in a translucent brown mucilaginous mass (Kendrick 1962, as Verticicladiella wagenerii).

There are three morphological variants of L. wageneri, which are host-specialized: L. wageneri var. wageneri infects mainly pinyon pine (Pinus monophylla); L. wageneri var. ponderosum infects mainly ponderosa pine (Pinus ponderosa), Jeffrey pine (Pinus jeffreyi), and lodgepole pine (Pinus contorta); L. wageneri var. pseudotsugae infects Douglas-fir (Pseudotsuga menziesii); (Harrington & Cobb Jr 1984, 1986, 1987, Cobb Jr 1988).

Notes:
1. A detailed description of this species is given by Kendrick (1962).
2. The teleomorph, Ophiostoma wageneri, has been found only on Pinus ponderosa (Cobb Jr 1988) and was described by Goheen & Cobb (1978, as Ceratocystis wagenerii).
3. PCR-based detection methods for this pathogen has been developed (Schweigkofler et al. 2005).
4. Bark beetles can carry the pathogen (Schweigkofler et al. 2005).

2.6. References
3. Diagnostic Images

Cross-section of an infected Douglas-fir stem (copyright, for use contact hansene@science.oregonstate.edu).
**Host symptoms - stem:** Everett M. Hansen Oregon State University

Black stain visible as longitudinal streaks in Douglas-fir (left) and ponderosa pine (right) (copyright, for use contact hansene@science.oregonstate.edu).
**Host symptoms - stem:** Everett M. Hansen Oregon State University

Black stain visible as longitudinal streaks in Douglas-fir (copyright, for use contact hansene@science.oregonstate.edu).
**Host symptoms - stem:** Everett M. Hansen Oregon State University

Brown hyphae of L. wageneri within xylem tracheids of Douglas-fir (copyright, for use contact hansene@science.oregonstate.edu).
**LM:** Everett M. Hansen Oregon State University

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