



ISSN: 0191-2917

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plant disease

Editor-in-Chief: Anthony P. Keinath

Published by The American Phytopathological Society

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January 2009, Volume 93, Number 1

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DOI: 10.1094/PDIS-93-1-0111B

Disease Notes

First Report of *Armillaria sinapina*, a Cause of Armillaria Root Disease, Associated with a Variety of Forest Tree Hosts on Sites with Diverse Climates in Alaska

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In August of 2007, a preliminary survey was conducted in Alaska to evaluate potential impacts of climate change on forest trees. *Armillaria sinapina*, a root-disease pathogen, was isolated from conifer and hardwood hosts on climatically diverse sites spanning 675 km from the Kenai Peninsula to the Arctic Circle. Seven isolates (NKAK1, NKAK2, NKAK5, NKAK6, NKAK9F, NKAK13, and NKAK15) were identified as *A. sinapina* by using intergenic spacer-1 nucleotide sequences (GenBank Accession Nos. EU665175-EU665181) and somatic pairings. Of particular note is that one isolate (NKAK9F) was obtained from a declining *Salix* sp. (willow) growing in a flood plain near the Arctic Circle (66°32.316'N, 150°47.717'W). This isolate was collected from mycelial bark fans that were intercalated within multiple bark layers, a sign of disease. All other isolates were derived from rhizomorphs attached to and/or embedded within roots and root collars, but most host trees showed no clear indication of disease. Two isolates were collected from dead trees within a small mortality center (62°08.703'N, 150°04.593'W) that included an isolate from *Picea glauca* (white spruce; NKAK13) and another isolate from *Betula* sp. (birch; NKAK15). Additional isolates came from a beetle-killed *P. glauca* (NKAK1) 120 km northwest of Anchorage (61°48.079'N, 148°16.983'W) and a suppressed (overtopped by other trees in the stand) *Tsuga mertensiana* (mountain hemlock; NKAK2) 58 km southeast of Anchorage (60°50.679'N, 149°03.742'W). The two remaining isolates originated from the Kenai Peninsula (approximately 60°29.629'N, 149°45.465'W) and were derived from a root-diseased *Populus tremuloides* (trembling aspen; NKAK5) and a suppressed *P. glauca* (NKAK6). Although *A. mellea* sensu lato was previously reported on willow in interior Alaska (1) and *A. sinapina* was previously reported from sites

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under coastal influence (4), this represents the first confirmed report of *A. sinapina* on *P. glauca*, *T. mertensiana*, *Populus tremuloides*, *Salix* sp., and *Betula* sp. in Alaska. Unfortunately, pathogenicity of *A. sinapina* cannot be readily verified under experimental conditions because environmental variables, host-tree status (e.g., species, population, age, and vigor), and inoculum potential are difficult to recreate. *Armillaria sinapina* is typically regarded as a weak pathogen of diverse hosts (3). However, *A. sinapina* is predicted to cause more disease on hosts predisposed by climate stress, and climate change is well-documented in Alaska (2). Because *A. sinapina* occurs on diverse hosts under different climates across a wide geographic range in Alaska, Armillaria root disease could become more prevalent on trees stressed by climate change.

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