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Short Communication

USDA Forest Service, Rocky Mountain Research Station, Moscow, Idaho, USA

Occurrence of the Root Rot Pathogen, *Fusarium commune*, in Forest Nurseries of the Midwestern and Western United States

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Abstract

Fusarium commune can cause damping-off and root rot of conifer seedlings in forest nurseries, and this pathogen has been previously reported from Oregon, Idaho, and Washington, USA. We collected *Fusarium* isolates from additional nurseries in the midwestern and western USA to more fully determine occurrence of this pathogen. We used DNA sequences of the mitochondrial small subunit gene to identify *F. commune*. In addition to confirming the occurrence of *F. commune* in Oregon, Idaho, and Washington, USA, we also discovered that *F. commune* is even more widespread with this first report of *F. commune* occurring in Nevada, Montana, Nebraska, and Michigan, USA.

Introduction

In most container and bareroot nurseries, the genus *Fusarium* is ubiquitous in nursery soils, on seeds of several conifer species, and on healthy and diseased conifer seedlings, especially Douglas-fir (*Pseudotsuga menziesii*), western white pine (*Pinus monticola*), and ponderosa pine (*Pinus ponderosa*) (James et al. 1990). The first report of Fusarium root rot in forest nurseries identified *Fusarium oxysporum* as the major pathogen, based on morphology (Bloomberg 1981). However, selected *Fusarium* spp. isolates, previously characterized as pathogenic on Douglas-fir seedlings, displayed a range of high, moderate, and low virulence (Stewart et al. 2006). On the basis of DNA sequences (mtSSU: mitochondrial small subunit and EF-1α: nuclear translation elongation factor 1-alpha), Stewart et al. (2006) identified all the highly virulent isolates as *F. commune*, a recently named species (Skovgaard et al. 2003). DNA sequences from the mtSSU or EF-1α regions were useful to distinguish *F. commune* from *F. oxysporum*.

Currently, *F. commune* is only reported in Oregon (Skovgaard et al. 2003; Leon 2009), Idaho (Stewart et al. 2006), and Washington (Leon 2009), although Fusarium root rot is widely reported from forest nurseries throughout western North America. Presumably, *F. commune* is one of the major pathogens in this disease; yet, little is known about its occurrence in forest nurseries across the midwestern and western USA. Thus, our study objective was to evaluate the occurrence of *F. commune* in the midwestern and western USA.

Materials and Methods

We collected 260 isolates of *Fusarium* spp. from forest nurseries in the midwestern and western USA, including Oregon (79 isolates), Idaho (56), California (43), Washington (31), Montana (14), Nevada (13), Utah (12), Nebraska (7), and Michigan (5). These isolates, collected from one to five nurseries in each state, represented diverse sources of host/substrate: (i) diseased or healthy seedlings of Douglas-fir, western white pine, ponderosa pine, grand fir (*Abies grandis*), sagebrush (*Artemisia tridentata*), rabbitbrush (*Chrysothamnus* sp.), eastern redcedar (*Juniperus virginiana*), western larch (*Larix occidentalis*), blue spruce (*Picea pungens*), lodgepole pine (*Pinus contorta*), Austrian pine (*Pinus nigra*), bitterbrush (*Purshia tridentata*), Pacific yew (*Taxus brevifolia*), western redcedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*), (ii) containers used to grow various conifer seedlings, and (iii) soil/growing media. All 260 isolates were previously classified as *F. oxysporum* based on morphological similarities (Bloomberg 1981), but were not identified based on DNA sequence data. The fungal cultures used in this study were deposited at the USDA Forest Service, Rocky Mountain Research Station, Forestry Sciences Laboratory, Moscow, Idaho, USA, and living subcultures are available upon request.