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Abstract

Characterizing the effects of dwarf mistletoe and other diseases for sustainable forest management

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Many insects, fungi, and plants in forest ecosystems can damage trees and forests, depending on stand and environmental conditions. Natural disturbances, harvesting, and other forest practices can retard or increase the spread and the effects of dwarf mistletoe and other diseases on tree growth. To monitor the effects of diseases, certification and monitoring programs typically use incidence and severity of infestations as criteria and indicators. However, these are often insufficient to characterize the impact of the disease or to measure the effects of new management practices, such as variable retention silviculture, on sustainability. Long-term observations and models of stand development are advocated as better methods for characterizing disease effects. For dwarf mistletoe (*Arceuthobium tsugense*), we are designing and monitoring installations in infested stands of western hemlock (*Tsuga heterophylla*) and constructing a spatial and life history model of stand and disease development. Disease spread and effects are influenced by several factors including site quality, stand density, and the spatial arrangement of infected trees, which are sources of mistletoe spread into new stands. Potentially, these factors could be manipulated to either reduce or encourage the spread and the effects of dwarf mistletoe.

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