Project:

Simulating Western Hemlock Dwarf Mistletoe Impacts in Coastal British Columbia

Objective:

A US Forest Service model for dwarf mistletoe is being assessed in British Columbia's coastal western hemlock forests to evaluate the effects of new management approaches on tree growth and to aid the development of appropriate forest practices.

The most effective methods to prevent or reduce impacts of dwarf mistletoe include clearcutting large blocks of mature trees and removing as many infected residuals as possible to prevent infection of new trees. These practices have been incorporated into current Forest Practices Code guidelines. However, recent industry proposals to reduce or eliminate clearcutting and retain as many living trees as possible raised concerns that these practices could increase impacts in infested stands in coastal BC. Previous observations indicated that where overstorey residual trees were left after harvest, spread of mistletoe was accelerated and more severe infection resulted. Unfortunately, there are few data to evaluate potential impacts of these practices. Many factors such as stand density, site index and biogeoclimatic zone are known to influence infection rates and impacts.

A model to predict the spread, effects of treatments, and impacts of the parasite on tree growth under various conditions would be very valuable. Such a model would enable foresters and managers to determine long-term effects on stand yields and retention of old-growth forest attributes, and facilitate development of more effective treatments and forest practices.

Progress

Thanks to funding provided by Forest Renewal BC via the Prognosis^{BC} project, a detailed dwarf mistletoe model developed for the US Forest Service was successfully linked to the ministry tree growth simulator "TASS" and to a coastal variant of the US "Forest Vegetation Simulator" (FVS). Simulations

Norm Alexander

Dwarf mistletoe is a parasite of western hemlock trees. The parasite spreads by seeds produced singly in berries on aerial shoots. In October, seeds are explosively discharged to distances of up to 10 metres.

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The parasite produces witches brooms and swellings that repress tree growth and reduce wood quality.

undertaken for several retention harvest regimes indicated significant future impacts of dwarf mistletoe.

Several localities were examined to determine potential stands that could be measured to determine dwarf mistletoe spread and impacts, and several will be examined further and measured. Field inspections indicated that most young stands have relatively little infection due to past sanitation practices, and in several instances, stand or environmental factors apparently limited shoot production and spread. Some of these effects were also found in the simulations.

We are also investigating a hypothesis proposed by Dr. H. Kimmins, University of BC, that dwarf mistletoe plays a significant role in the ecology and succession of old-growth western hemlock forests. Dwarf mistletoe stem swellings, often associated with tree breakage or collapse, apparently increase vulnerability of infected trees to wind damage. Gaps created in canopy structure could increase mistletoe spread, infection of hemlock, and succession to other less susceptible tree species such as western redcedar. Further work is underway to simulate effects of different spatial arrangements of old-growth and young trees in various silviculture retention systems on spread and impacts of hemlock dwarf mistletoe.

An *ad hoc* working group of scientists and foresters has been established to oversee the project. For further information or inquiries about the group or the project, please contact:

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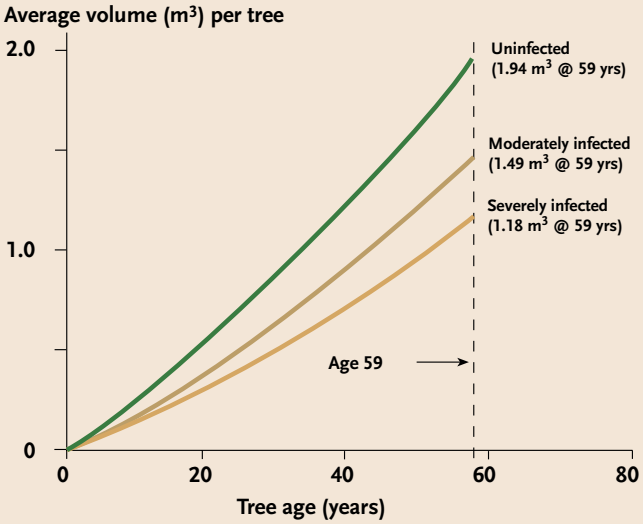
Dwarf Mistletoe in BC Coastal Western Hemlock

Dwarf mistletoe is common on western hemlock in coastal British Columbia.



Volume impacts of hemlock dwarf mistletoe related to severity of infection (Thomson et al. 1985, C.J.F.R. 15: 665–668). Growth losses are estimated at over 1 million m³ per year in coastal BC.