Lodgepole pine, a valuable timber species in the B.C. interior, is susceptible to several stem diseases which can cause growth and yield reduction, lumber degradation, stem breakage and mortality. Juvenile spacing is being prescribed for densely regenerated backlog pine stands, and a study was initiated to determine the impact of this practice on the incidence and development of disease infection.

In 1980, Dr. Bart van der Kamp of the UBC Department of Forest Sciences conducted a survey of the incidence of atrorpsis canker, western gall rust, stellactiform blister rust and comandra blister rust in stands spaced in 1979 or 1979 and in nearby unspaced stands at 13 interior locations. To study the development of the diseases over time, four of these locations (near Vanderhoof, Houston, Bowes Creek and Beaverdell) were selected as permanent sampling points. Four plots were installed at each: 2 in the treatments and 2 in the unthinned controls. At establishment, tree diameters and the location on the tree of each infection were recorded. The remeasurement of these plots in 1985 and the subsequent data analyses and reporting were sponsored under FRDA Project 3.7.

The objectives of the remeasurement were:

1. to assess how juvenile spacing of a lodgepole pine stand affects the incidence of new disease infection and the development of previous infections, and
2. to compare the severity of the four diseases and their impacts on timber growth and yield at the different locations over time.

During the remeasurement, the DBH of all trees and the heights of the five trees nearest plot centre were recorded. Where trees had died, an attempt was made to determine the cause of death. The state of all infections noted in 1980 was reassessed and the location of all new infections was recorded.

The initial 1980 survey revealed no significant differences between the spaced and unspaced plots in the numbers of trees infected. This indicates that diseased trees were not preferentially selected for removal during the spacing operations.

Western gall rust was the most common disease encountered at both the 1980 and 1985 measurements, and was present at all locations. There were no significant differences in infection incidence and development between the spaced and unspaced areas from 1980 to 1985. Furthermore, the initial level of gall rust infection did not strongly influence the amount of new infection occurring between 1980 and 1985 among the samples.

Stellactiform blister rust was present at only the Vanderhoof and Houston permanent sample plot locations. Over the five-year period, the rate of infection in the thinned area was greater than in the unthinned area (27% vs 3%, respectively). Two reasons for this difference were postulated. First, the disease's alternate host (Castilleja spp.) was more abundant in the thinned areas. Second, live branches, which are infection sites for the rust, persist longer in the thinned stands.

Comandra blister rust was common at only the Houston installation. The number of infected trees was more than tripled from 1980 to 1985 at this location, both in the thinned and control plots. Branch infections were found to quickly progress down the branches to infect the bole. This disease girdles trees rapidly. Hence, all infected trees will likely be dead in the next decade.

Atrorpsis canker was a significant disease at the Bowes Creek and Beaverdell locations in 1980. Infections occurred on trees older than 18 years and mainly on the stems below the crowns. By 1985, many of these had healed over, forming calluses on either side of the canker. Consequently, it is unlikely that this disease will girdle and kill many trees. However, losses through stem deformation, staining and resinos in the lumber could be significant.

With the exception of stellactiform rust, changes in stand conditions resulting from juvenile spacing did not significantly affect the development of disease in the stands. However, because diseased trees were not selectively removed during spacing, an opportunity to reduce the level of infection in the treated areas was missed. The following averages, which include stellactiform, comandra and atroprpsis infections and gall rust bole infections, are noteworthy:
1. By 1985, one third and one fifth of the living trees in the thinned and unthinned plots, respectively, were diseased.

2. Of the trees alive in 1980, 6% (thinned plots) and 6% (unthinned plots) had died by 1985; many of these as a result of disease.

These losses are considered to be substantial. The project report concludes that, where these diseases occur, considerable damage can be expected, especially after non-selective juvenile spacing. It was recommended that more care be taken to ensure that diseased trees are removed when spacing and that stocking standards for juvenile spacing reflect considerable allowance for further anticipated losses, especially where stadialiform and comandra blister rusts are present.

For further information on this project, see "van der Kamp and Spence, 1987. Stem diseases of lodgepole pine in the British Columbia Interior following juvenile spacing. For. Chron. 63:334-339." or contact:

Bart van der Kamp
UBC Department of Forest Sciences
270 - 2357 Main Mall
Vancouver, B.C. V6T 1W5
(604) 228-2728