



Timber Talks



Department of Fisheries and Forestry

Prepared by V. H. Phelps, Forest Research Laboratory, 506 W. Burnside Road, Victoria, B.C.

Douglas-fir Needle Blight

No. 61

A parasitic fungal infection that causes a serious needle blight is common throughout the range of Douglas fir. Needle cast may be very severe, frequently causing heavy defoliation which results in negligible growth and tree disfigurement. Spores emanating from the fungus fall on new needles during early summer and by early winter yellowish spots are visible. The following spring, reddish-brown spots become evident and heavily infected trees take on a mottled appearance. The time of needle-casting is dependent on the severity of the infection, but it occurs mainly during the summer months. Rhabdocline pseudotsuga has been regarded as the causal agent of this disease, but sufficient morphological differences have been observed that the possibility of identifying additional species or subspecies of the genus was investigated.

Numerous samples of the fungus were collected from many areas, and their morphological features were carefully examined for the presence of an apical pore in the sac-like spore containers (asci). Inoculation experiments were also conducted on seedlings and individual tree branches.

There are two species of what has previously been known as a single species of the fungus. One, comprising two subspecies, lacked any pore structure in the ascus apex. In this species there is a thinning of the inner wall at the ascus tip, which dimples in and ruptures to eject the spores. The rupture may be a simple slit, a double-lipped opening or a folding back of the ascus tip. The other species, which includes three subspecies, has a starch-like cylinder perforated by a central pore at the apex of the ascus through which the spores are ejected. Differences in the shape of spores within the ascus were evident and provided further means for positive identification.

Four of the five subspecies are common in western North America and may occur in varying intensities on the same tree. The proven existence of five entities offers an explanation for the differences in symptoms of the disease that have been observed in North America and attributed to a single causal agency, and accounts for the constancy of disease symptoms noted in Europe.