STATUS OF RHABDOCLINE NEEDLE CAST ON DOUGLAS-FIR AT THE BIGFORK TREE IMPROVEMENT AREA, KOOTENAI NATIONAL FOREST 1989

R. L. James
Plant Pathologist

USDA Forest Service
Northern Region
1201 Ironwood Drive
Coeur d'Alene, ID 83814

Nursery Disease Notes #92

November 1989

The Bigfork Tree Improvement Area was established in 1987 to evaluate performance of Douglas-fir (*Pseudotsuga menziesii* (Mirb.)Franco) and western larch (*Larix occidentalis* Nutt.) as early selection trials. Some of these trials may eventually become seed orchards once superior families are identified. One of the major limiting factors of growing Douglas-fir in the area is a disease caused by *Rhabdocline pseudotsugae* Syd. and *R. weirii* Parker & Reid. Infection by these fungi is common on Douglas-fir and can be especially damaging within Christmas tree plantations (O'Brien and Morton 1983; Stambaugh and Bramble 1952). Damage from this disease was so intensive in the Bigfork area that Douglas-fir was largely replaced by other conifer species such as Scots pine (*Pinus sylvestris* L.) for Christmas tree production.

The first planting of Douglas-fir was established in the northeast portion of the tree improvement area in the spring of 1989. One of the management concerns for this and future Douglas-fir plantings was Rhabdocline needle cast. In formulating an Environmental Assessment (EA) for dealing with pests at the site, options to reduce potential impacts of this disease were addressed. Probably the most practical means of effectively controlling *Rhabdocline* is application of protective fungicides during the spring when young needle tissue is susceptible to infection. Fungal apothecia of *Rhabdocline* produce viable spores in the spring beginning just prior to bud break and shoot elongation of Douglas-fir (Morton and Miller 1982). Protective fungicides should first be applied after bud break but prior to onset of new needle elongation. They should be applied at 2- to 3-week intervals depending on weather conditions (Morton and Miller 1982). If cool, wet weather prevails during the period of needle elongation, several fungicide applications may be required until warm dry weather begins because the fungus actively sporulates and induces infection during periods of high humidity and cool (13-15°C) weather (Parker 1970).

This usually means 2-3 applications in the spring and early summer. Several fungicides have been shown to be effective: benomyl, ferbam, and chlorothalonil (Morton and Miller 1982). Either of these chemicals are effective in protecting foliage from infection; however, they are not effective in eradicating infections once they occur.

One application of chlorothalonil was made in the Douglas-fir plantation at Bigfork during the spring of 1989. No more was deemed necessary because warm, dry weather persisted throughout much of June. Spores of *Rhabdocline* can only infect elongating young needles (Skilling and Morton 1983); once needles are about 1 month old, they are no longer susceptible to infection.

During June 1989, the plantation was evaluated for presence and extent of Rhabdocline needle cast. Only a few infected seedlings were found; these were scattered throughout different portions of the plantation. Infections, as evidenced by presence of mature fruiting bodies on needles (Fig. 1), were limited to the lower portion of crowns just above the groundline. No infected needles higher in the crown were found. On most infected seedlings, only a few infected needles were seen; very little needle abscission was evident.

It is important that Douglas-fir plantations at the Bigfork Tree Improvement Area be treated to prevent infection and monitored annually in June for Rhabdocline needle cast. Since this disease has such an important history in the area and can significantly reduce growth of infected trees (Stephan 1973), it is important that steps be taken to monitor and control the disease. Continued use of protective fungicides are recommended during periods of needle susceptibility.

LITERATURE CITED

Korf, R. P. 1962. A synopsis of the Hemiphacidiaceae, a family of the Helotiales (Discomycetes) causing needle-blights of conifers. Mycologia 54:12-33

Morton, H. L. and R. E. Miller. 1982. Chemical control of Rhabdocline needle cast of Douglas-fir. Plant Disease 66:999-1000.

O'Brien, J. G. and H. L. Morton. 1983. Occurrence of *Rhabdocline* taxa in Douglas-fir Christmas tree plantations in Michigan. Plant Disease 67:661-663.

Parker, A. K. 1970. Effect of relative humidity and temperature on needle cast disease of Douglas-fir. Phytopathology 60:1270-1273.

Parker, A. K. and J. Reid. 1969. The genus *Rhabdocline* Syd. Can. J. Bot. 47:1533-1545.

Skilling, D. D. and H. L. Morton. 1983. How to identify and control Rhabdocline and Swiss needlecasts of Douglas-fir. USDA Forest Service, North Central Forest Experiment Station Leaflet HT-59.

Stambaugh, W. J. and W. C. Bramble. 1952. The occurrence of Rhabdocline needle cast of Douglas-fir in Pennsylvania. Plant Dis. Reptr. 36:292-293.

Stephan, B. R. 1973. Uber Anfalligkeit und Resistenz von Douglasiein -Herkunften gegenuber *Rhabdocline pseudotsugae*. Silvae Genetica 22:149-153.

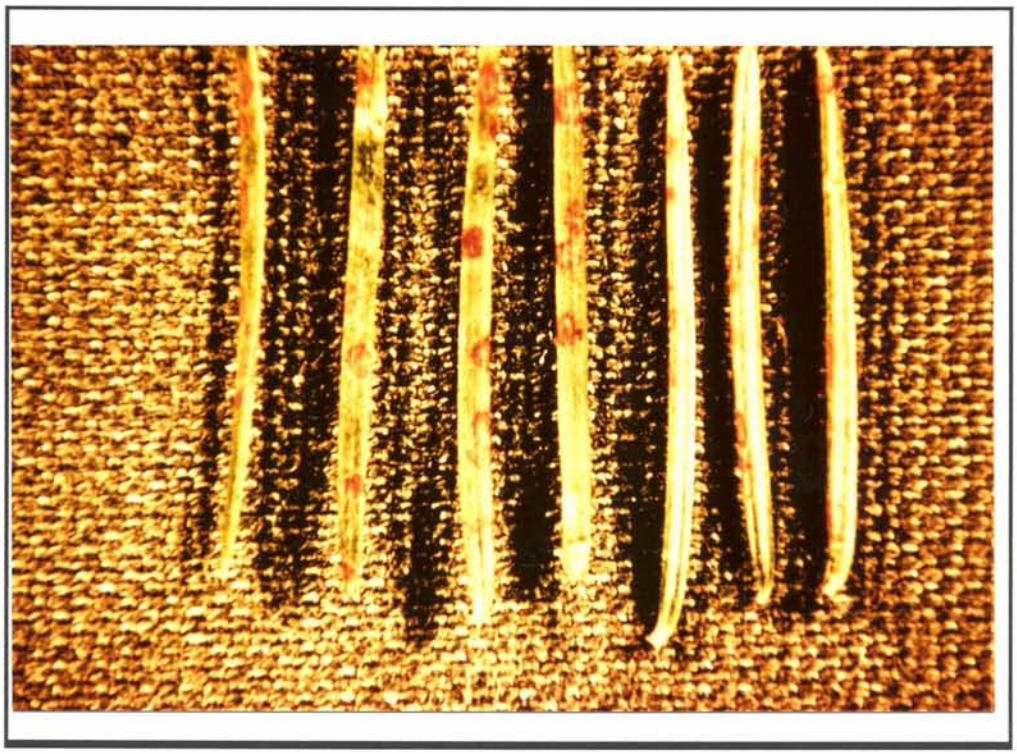

Figure 1.--Douglas-fir needles infected with Rhabdocline needlecast fungi. Note brown lesions that appear on both upper and lower needle surfaces. Apothecia of *Rhabdocline* will form within necrotic areas during the spring during cool, wet weather.