DISCOLORATION OF CONTAINERIZED WESTERN WHITE PINE SEEDLINGS - WESTERN FOREST SYSTEMS NURSERY, LEWISTON, IDAHO

R. L. James
Plant Pathologist

Cooperative Forestry and Pest Management
USDA Forest Service
Northern Region
Missoula, Montana

July 1987

Recently some containerized western white pine (*Pinus monticola* Dougl.) seedlings grown at the Western Forest Systems Nursery in Lewiston, Idaho, displayed needle tip discoloration (fig. 1). Affected needles initially became chlorotic and then turned red-brown. Some needle twisting, which might be indicative of wilting (James 1985a; James 1985b) was evident and premature needle adscission occurred.

Examination of foliage failed to reveal evidence of possible pathogenic fungi. Roots of affected seedlings appeared healthy for the most part; there was very little necrosis or root tip decay.

Roots of 5 seedlings were aseptically dissected and placed on a selective medium for *Fusarium* spp. (Komada 1975). A minimum of 20 pieces of root from each seedling were randomly selected from the dissected root system. Plates with root pieces were incubated at about 22 degrees C for 7-10 days under a diurnal regime of fluorescent light.

Fusarium oxysporum Schlect., the only *Fusarium* spp. consistently isolated, was found on four of the five root systems. The proportion of root systems colonized with *Fusarium* for infected seedlings was estimated to be 35 percent. The occurrence of *F. oxysporum* on roots of containerized seedlings is not unusual (James et al. 1987). Infections are sometimes associated with disease symptoms and sometimes not. Environmental factors, especially the severity of seedling stresses, probably affect disease symptom production in infected seedlings. The containerized white pine seedlings from the Western Forest Systems Nursery showed symptoms that may indicate early stages of *Fusarium* root disease (James 1985b). However, other factors including abiotic stresses may have been important as well. It is likely that disease symptoms would not be severe if levels of root infection by Fusarium spp. were low. Therefore, it is probably important that growers take steps to limit the amount of inoculum available for seedling infection. Possible sources of inoculum include seed (James 1986), styroblock containers (James and Gilligan 1987), container soil mixes (James 1985c), and other sources such as debris within greenhouses. Extent of the efforts to reduce inoculum should be geared toward severity of the disease that is occurring.

Figure 1. Containerized western white pine seedling displaying foliar chlorosis which is associated with root infection with Fusarium oxysporum.

LITERATURE CITED

James, R. L. 1985a. Containerized western white pine seedling mortality at the Bonners Ferry Ranger District, Idaho Panhandle National Forests. USDA Forest Service, Northern Region. Rept. 85-17. 15 p.

James, R. L. 1985b. Decline of containerized western white pine seedlings at the USDA Forest Service Nursery, Coeur d'Alene, Idaho. USDA Forest Service, Northern Region. 4 p.

James, R. L. 1985c. Diseases associated with containerized seedling soil mixes. Tree Planters' Notes 36(2):3-5.

James, R. L. 1986. Diseases of conifer seedlings caused by seed-borne *Fusarium* species. *In*: Shearer, R. C. (Compiler). Proceedings--Conifer Tree seed in the Inland Mountain West Symposium. USDA Forest Service. Intermountain Res. Sta., Gen. Tech. Rept. INT-203. pp. 267-271.

James, R. L. and C. J. Gilligan. 1987. Root disease of containerzed conifer seedlings - Champion Timberlands Nursery, Plains, MT. USDA Forest Service, Northern Region. (In preparation).

James, R. L., R. K. Dumroese, D. L. Wenny, J. F. Meyers, and C. J. Gilligan. 1987. Epidemiology of *Fusarium* on containerized Douglas-fir seedlings. 1. Seed and seedling infection, symptom production, and disease progression. USDA Forest Service, Northern Region (In preparation).

Komada, H. 1975. Development of a selective medium for quantitative isolation of *Fusarium oxysporum* from natural soil. Rev. Plant Protect. Res. 8:114-125.