

FUSARIUM OXYSPORUM ON ROOTS OF
CONTAINERIZED WESTERN LARCH SEEDLINGS,
UNIVERSITY OF MONTANA

R. L. James
Plant Pathologist

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

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Several western larch (Larix occidentalis Nutt.) seedlings being grown at the University of Montana for inoculation with Botrytis were dying prior to use because of apparent root disease. Seven Leach[®] cells containing 12 seedlings were evaluated for occurrence of root pathogens that might be associated with disease symptoms. Seedlings were initially rated for severity of disease symptoms based on foliar chlorosis and necrosis (table 1). They were then carefully extracted from their containers. Roots were washed thoroughly under tap water to remove soil particles prior to isolations. Ten lateral roots from each seedling were selected. Points of root attachment (joints) and tips of each selected root were aseptically cut and placed on an agar medium selective for Fusarium (Komada 1975). Plates were incubated under cool fluorescent light for 7 days after which fungi emerging from roots were identified.

Table 1.—Root disease severity ratings for seedlings infected with Fusarium

<u>Rating</u>	<u>Description</u>
0	No symptoms; seedling crown entirely green.
1	Seedling with slight needle tip dieback, particularly concentrated on the upper whorls of needles.
2	Seedling with lower whorl of needles partially or completely necrotic; seedling upright.
3	Seedling with needle tip dieback affecting at least one-half of the crown.
4	Seedling with one-half of its crown with necrotic foliage (upper or lower); seedling upright.
5	Seedling with one-half of its crown with necrotic foliage (upper or lower); seedling bent over.
6	Seedling with three-fourths of its crown with necrotic foliage; seedling may be upright or bent over.
7	Seedling with its entire crown necrotic; seedling may be upright or bent over.

Fusarium oxysporum was isolated from all seedlings regardless of their disease symptoms. Average root colonization for seedlings with disease symptoms was greater than for seedlings without symptoms, but differences were not significant ($p=0.05$, using a standard t test)(table 2). Two morphologically different strains of F. oxysporum were isolated. Most were purple pigmented isolates; others failed to produce pigments and were orange in color. Most isolations yielded F. oxysporum exclusively (figure 1), indicating that other fungi had not commonly infected roots.

Table 2.—Colonization of western larch seedling roots with Fusarium oxysporum, University of Montana

<u>Seedling No.</u>	<u>Disease rating</u>	<u>Percent colonization</u>		
		<u>Root tips</u>	<u>Root joints</u>	<u>Total</u>
1A	7	100	90	95
2A	7	100	100	100
3	7	100	90	95
4A	6	100	100	100
5A	7	100	100	100
5B	7	100	100	100
6A	7	90	100	95
7	7	100	100	100
<u>Average</u>	-	<u>98.8</u>	<u>97.5</u>	<u>98.2</u> ¹
1B	2	100	40	70
2B	2	100	100	100
4B	2	90	80	85
6B	2	100	100	100
<u>Average</u>	-	<u>97.5</u>	<u>80.0</u>	<u>88.8</u> ¹

¹Mean differences were not statistically significant ($P = 0.05$).

It was concluded that F. oxysporum was the principal cause of mortality of containerized western larch seedlings. Inoculum sources are unknown, but this fungus frequently colonizes conifer seed and may occur on other host plants within the greenhouse. Root infection by this fungus may influence susceptibility of foliage to infection by Botrytis; therefore, care should be taken to produce seedlings in an environment where likelihood of Fusarium infection is small.



Figure 1.--Isolation of Fusarium oxysporum from roots of western larch seedlings. Most isolations only yielded this fungus which contains a purple pigmentation.

LITERATURE CITED

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