

TIP DIEBACK OF CONTAINERIZED LODGEPOLE PINE AND DOUGLAS-FIR SEEDLINGS
CHAMPION TIMBERLANDS NURSERY,
PLAINS, MONTANA

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Containerized conifer seedlings may often display tip dieback symptoms, particularly towards the end of the growth cycle when seedlings are stressed to stop their growth and set buds (James 1984b; James 1986a). Symptoms are often subtle, sometimes with only a few needle tips being necrotic. However, such seedlings may have a large portion of their roots infected with species of Fusarium, even though these roots may appear healthy (without external signs of necrosis)(James 1986b).

Five containerized lodgepole pine (Pinus contorta Dougl.) and three Douglas-fir (Pseudotsuga menziesii (Mirb.) Franco) seedlings with tip dieback symptoms were received from the Champion Timberlands Nursery, Plains, Montana. An example of the level of foliar necrosis typical of the seedlings is shown in figure 1. Roots from this seedling generally appeared healthy (figure 2); most of the other seedlings also had root systems that did not look diseased.

Ten roots were randomly selected from each seedling for assay of possible pathogenic fungi. Pieces of each selected root were cut from its tip and where it joined the main or other lateral root. These pieces were surface sterilized for 1 minute in 10 percent aqueous sodium hypochlorite and placed on a selective medium for Fusarium (Komada 1975). Fungi emerging from root pieces were identified after incubation for 5 days at 20-22°C under cool fluorescent light.

Isolation results are summarized in table 1. Fusarium oxysporum Schlect. was the only Fusarium species isolated from roots. It was obtained from about 95 percent of the root tips and 92 percent of the root joints sampled. In many cases, it was the only fungus isolated. Most of the root pieces from which F. oxysporum was isolated were not necrotic (had intact epidermis that was not discolored).

This work confirmed previous findings that Fusarium commonly colonizes roots of containerized seedlings with slight foliar symptoms (James 1984a; James 1984b). The large percentage of root colonization of these seedlings corresponds to previous findings; i.e., by the time seedlings begin to display foliar symptoms, most of their root systems are colonized by Fusarium (James 1986b).



Figure 1.--Tip dieback symptoms of containerized lodgepole pine seedling (#5) from the Champion Timberlands Nursery, Plains, Montana.

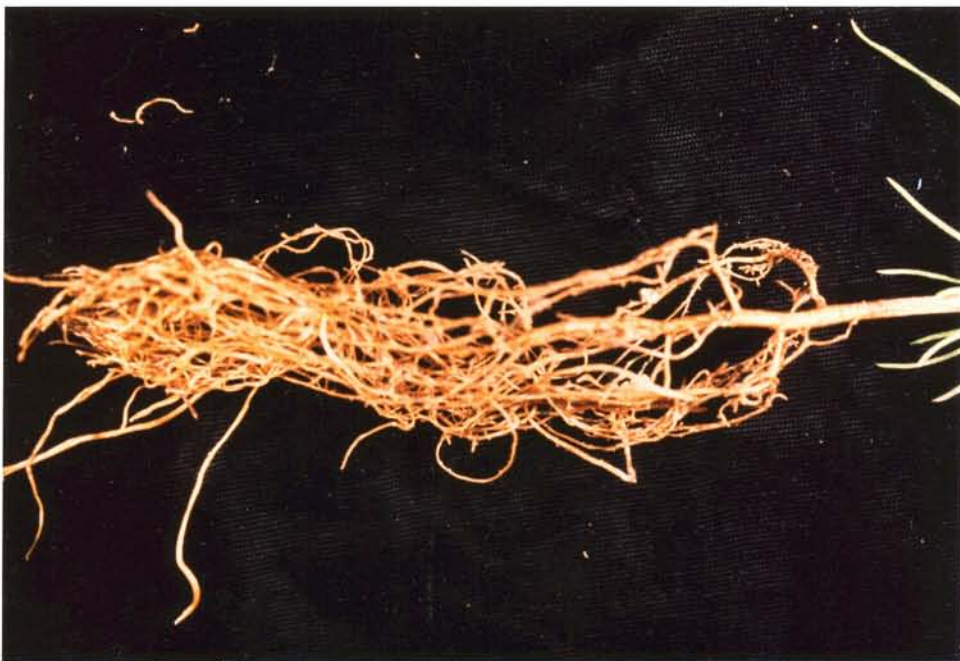


Figure 2.--Root system of containerized lodgepole pine seedling (#5).

Table 1.—Occurrence of Fusarium oxysporum on roots of containerized lodgepole pine and Douglas-fir seedlings with needle tip dieback symptoms, Champion Timberlands Nursery, Plains, Montana.

Seedling No.	Species ¹	Percent colonization with <u>Fusarium oxysporum</u>		
		Tips	Joints	All samples
1	LP	80	90	85
2	LP	100	100	100
3	LP	80	90	85
4	LP	100	100	100
5	LP	100	80	90
6	LP	100	80	90
7	DF	100	90	95
8	DF	100	100	100
9	DF	100	100	100
Ave.	-	95.5	92.2	93.9

¹LP = lodgepole pine; DF = Douglas-fir

It is possible that Fusarium infects many seedling roots early in the growth cycle, but symptoms of infection only appear after seedlings become stressed (James 1986a). Unfortunately, by the time seedlings start to display symptoms, the disease is difficult to control with chemicals. Therefore, it is important to try to prevent infection by sowing pathogen-free seed and maintaining a clean growing environment (James 1986a).

LITERATURE CITED

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