FUNGAL CONTAMINATION OF WESTERN LARCH SEED NORTH WOODS NURSERY, ELK RIVER, IDAHO 1990

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Western larch (***Larix occidentalis*** Nutt.) is one of the most important reforestation species in the northern Rocky Mountains. Unfortunately, seed production by this species is erratic and often limited by insect infestations and frost damage during cone production. Abundant seed crops are rarely found. However, when present, large amounts of seed are collected and often stored for use over several years.

The Idaho Department of Lands (IDL) has one such lot (PO-56) which has been used extensively for the past several years. Some of this seed was sent to the North Woods Nursery in Elk River, Idaho for production of container-grown seedlings. During the 1988 crop, higher than normal disease losses were experienced within this particular seedlot (James 1988b). Even so, more of this seed was sown in 1990 and poor germination and relatively high levels of pre- and post-emergence damping-off resulted.

Collections of ungerminated seed and seedcoats discarded from germinated seed were analyzed for colonization by potentially pathogenic fungi. High levels of ***Fusarium*** had previously been detected on seed from this lot (James 1988b). Therefore, seed samples were placed on a selective medium for ***Fusarium*** and closely-related fungi (Komada 1975). Forty-five ungerminated seeds and 22 seedcoats from recently-germinated seed were aseptically placed on the medium. Plates were incubated under diurnal cycles of cool, fluorescent light at about 26°C for 7-10 days. Emerging fungi were identified to genus and selected isolates transferred to potato dextrose agar. ***Fusarium*** isolates were incubated on carnation leaf agar which stimulates production of macroconidial sporodochia necessary for identification (Fisher and others 1982). ***Fusarium*** isolates were identified using taxonomic descriptions of Nelson and others (1983).

Fusarium spp. were isolated from about 62% of the ungerminated seed (Table 1). This was approximately the level previously found for this seedlot at the North Woods Nursery (55.6% in 1988). ***Fusarium*** spp. were also isolated from more than 90% of the seedcoats discarded from recently-germinated seed. Three ***Fusarium*** species were consistently isolated from ungerminated seed: ***F. oxysporum*** Schlecht., ***F. acuminatum*** Ell. & Ev., and ***F. sambucinum*** Fuckel. The most common species colonizing discarded seed coats was ***F. acuminatum***, which often produced orange sporodochia on seedcoat surfaces.

Fusarium spp. commonly colonize the surface of western larch seed (James 1986b, 1988b). Infected seed provides an important means by which pathogenic fungi are introduced into container operations (James 1986a). Although levels of ***Fusarium*** on seed may be reduced by treatment with running water rinses for several hours (James 1987; James and Genz 1981), some inoculum may still persist after such treatment, particularly when contamination levels are high. IDL seedlot PO-56 was severely contaminated with ***Fusarium*** and performance of this seedlot was greatly affected by this contamination. Running water rinses may not sufficiently reduce levels of contamination for this particular seedlot. Other possible options include hot water treatment to kill inoculum on seedcoats (James and others 1988), surface sterilization with disinfectants such as bleach and hydrogen peroxide (Barnett 1976; Dumroese and others 1988), and seed treatment with fungicides (Lock and others 1975) or biological control agents that will limit development of ***Fusarium*** (Baker and Cook 1975).

Cylindrocarpon, which may be pathogenic to conifer seedlings (James 1988a), was also isolated from a low percentage of ungerminated seed. Most other fungi isolated from ungerminated seed or discarded seedcoats were common saprophytes, including species of ***Trichoderma***, ***Penicillium***, and ***Phoma***. ***Botrytis cinerea*** was isolated from one discarded seedcoat. This fungus may be important in container operations and has previously been isolated at low levels from conifer seed (James 1990). It is not known if seed is an important source of inoculum introduction of this potentially important fungus.

Table 1. Fungal colonization of western larch seed (IDL lot PO-56) from the North Woods Nursery.

	Percent Seed Colonization*						
	FOXY	*Fusarium*** FACU	FSAM	ALL	*Cylindrocarpon*	*Trichoderma*	Other***
Ungerminated Seed	35.5	11.1	15.5	62.2	6.7	26.7	48.8
Seed Coats	4.5	90.9	0	90.9	0	4.5	18.1

* Sample sizes: ungerminated seed = 45; Seed coats = 22

** FOXY = ***Fusarium oxysporum***; FACU = ***Fusarium acuminatum***; FSAM = ***Fusarium sambucinum***.

*** Includes ***Phoma***, ***Penicillium***, and ***Botrytis***.

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