CONIFER SEED PATHOLOGY

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To ensure the supply of high-quality conifer seeds for nursery production, it is important to know and be aware of tree diseases that prevent or reduce the production of seeds, disease organisms carried by seeds, and microorganisms that can damage seeds in storage. Very little is known in this area because no research has been done in the prairie provinces. I would like to briefly discuss several aspects.

SPRUCE CONE RUST

This is the only cone disease I can think of that adversely affects production of conifer seeds in the prairie provinces. It is caused by a rust fungus, *Chrysomyra pirolata*, and attacks cones of white and black spruces. Several other rusts on pine and spruce cones are known but are not important in this part of North America. Up to 85% of cones have been reported damaged by spruce cone rust, and infection rates of 20-30% are common. The fungus infects cones systematically, and seeds in infected cones are not viable. Infected cones open much earlier than healthy ones and are easily recognized in the field. Because this disease cannot be carried by seeds, it is safe to use seeds collected from an infested area. The life cycle of this rust is rather complicated, having five different spore stages. Also, this fungus needs another group of plants in addition to spruce to complete its life cycle. Species of wintergreen (*Pyrola* spp.) are alternate hosts of the fungus. Preliminary results by Dr. J.R. Sutherland (Pacific Forest Research Centre, Victoria, B.C.) show that levels of infection are predictably proportional to the population of infected wintergreen plants in the stands. Spruce cone rust is important in situations such as seed orchards and designated seed collecting areas. Control measures have not been established, but in certain situations eradication of wintergreen plants should be effective and may be economically feasible.

SEED-BORNE DISEASES

Many plant diseases are known to be carried and disseminated by seeds. Our knowledge in this area is still very scanty; however, several cases have been documented in recent years. A soil-borne fungus, *Caloscypha fulgens*, that was found in England several years ago originated in spruce seeds sent from western Canada and was found to be damaging to seeds (Salt 1974). This fungus has since been found in Canada (Paden *et al.* 1978, Sutherland and Woods 1977). A pathogen of a seedling disease, *Ascochyta piniperda*, is also known to be carried by seeds of conifers.

SEED STORAGE FUNGI

Under certain seed storage conditions, growth of various fungi are encouraged and often cause mortality of seeds. A study in the U.S.S.R. isolated 78 different species of fungi from pine and spruce seeds (Prisyazhnyuk 1960) and indicated that methods of cone collection, condition of transport, and storage environment were important factors. Dr. Sutherland suggests that if storage conditions are proper, which means low in temperature and moisture, this problem should not cause much concern. To understand and cope with the problem of seed-borne diseases and seed storage fungi, it is important to consider those problems in relation to various tree seed activities such as cone collecting, transportation, storage, seed extraction, and presowing treatments.

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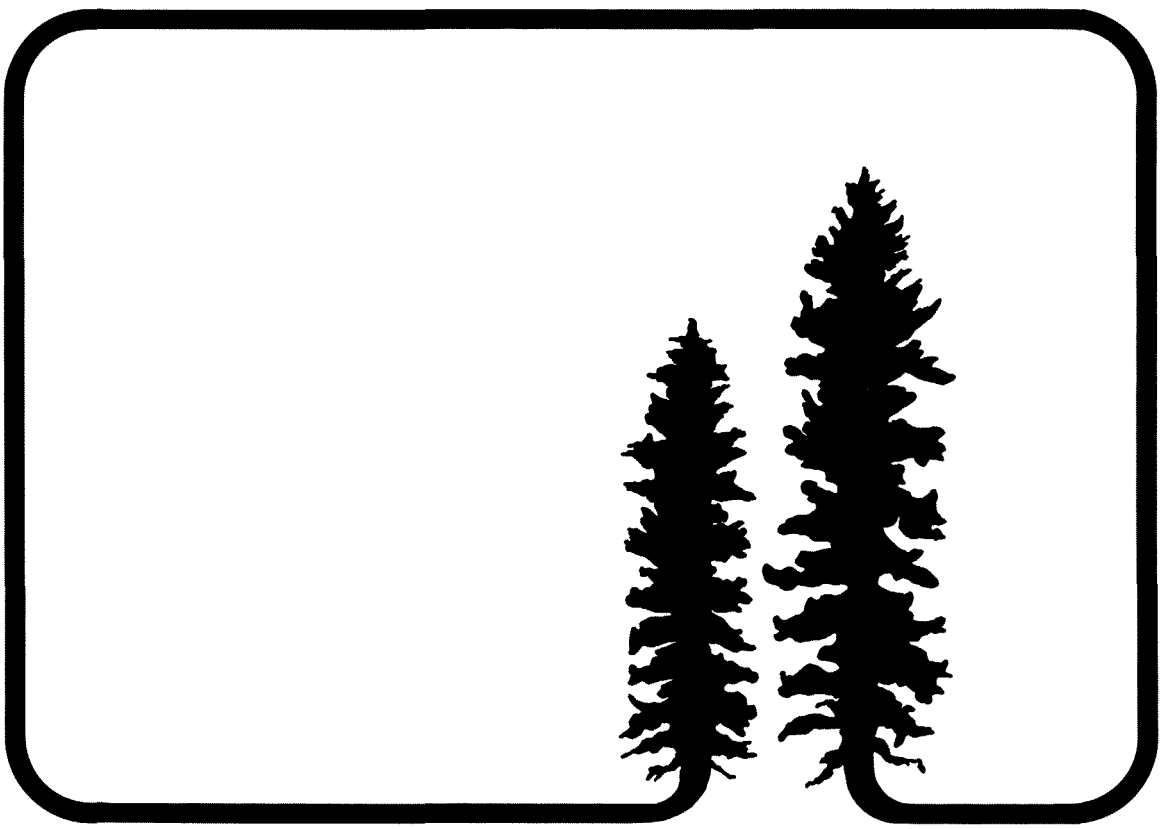

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