



**PORT-ORFORD-CEDAR FAMILY VARIATION IN RESISTANCE TO
PHYTOPHTHORA LATERALIS: GREENHOUSE TEST OF 125 FAMILIES**

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Artificial inoculation of young Port-Orford-cedar (*Chamaecyparis lawsoniana*) seedlings in containers provides a method of potentially evaluating hundreds of seedling families or rooted cuttings over a relatively short time period for resistance to the root pathogen *Phytophthora lateralis*. This method has now been used as a tool for more than ten years in an operational screening program to select resistant trees to establish seed orchards.

The trial reported here evaluates 125 seedling families of Port-Orford-cedar (POC) inoculated with *P. lateralis* in February 2005. The seedlots were a mixture of control crosses (full-sib and selfs) and open-pollinated half-sib families from 88 parents (87 unrelated). The seedlots represent a mixture of untested parents and previously tested parents. Seedlings were approximately 11 months old at time of inoculation, and were grown in 164 cm³ tubes in soil-less medium. Families were arranged in seven blocks in a randomized complete block design, generally with seven trees per family in each block. A mixture of two isolates of *P. lateralis* was used to inoculate the roots. Seedlings were kept in the greenhouse after inoculation.

Mortality of seedlings has been assessed thirteen times through January 30, 2007 (approximately 24 months after inoculation). Dead trees were recorded by date of assessment. A seedling was considered 'dead' when a stem lesion was evident around the stem above ground level following scraping of the bark. The first symptom was often wilted or slightly off-color foliage. Mean trial mortality was 54.1% at 12 months and 60.3% at 24 months after inoculation. Families ranged in mortality from 0 to 100%. Several previously well documented resistant and susceptible parents performed as expected, showing low, moderate, and high levels of mortality.

Rates of mortality varied widely for families with high levels of mortality. Of the three families with 100% mortality, two reached 100% mortality within 130 days from inoculation, while the third family took 217 days. Traditionally, mortality was assessed for only up to 12 months in our trials. However, the longer trial period here appears to separate families with moderate levels of mortality and putative major gene resistance from those that are 'slow dying'. There may be at least two types of resistance, and this separation will allow us to classify families for selection and breeding. Field trials are underway to ascertain the utility of both types of resistance. In addition, future greenhouse trials will examine the repeatability of the 'slow dying' type of resistance.