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FIELD NOTE

Growth and Survival of Port-Orford-Cedar Families on Three Sites on the South Oregon Coast

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ABSTRACT

Port-Orford-cedar is of interest to ecologists and foresters, but little information is available on its growth, its genetic variation, or the field performance of families selected for resistance to root disease. Survival, damaging agents, and growth were evaluated for nine families at three outplanting sites in south coastal Oregon. Survival was excellent on two sites. Family differences were observed in growth rates, foliage dieback, and tendency to form multiple stems after browsing. Mean tree height 8 growing seasons after planting was 2.6 m; the heights of the tallest trees on one site were >5.5 m.

Keywords: *Chamaecyparis lawsoniana, Phytophthora lateralis,* multiple stems, browsing damage, foliage disease

Port-Orford-cedar (*Chamaecyparis lawsoniana*) has a narrow native range (in northern California and southern Oregon; Zobel 1990), but as an ornamental, it has been widely planted on several continents. The wood of the species is quite valuable, but introduction of a nonnative root rot, *Phytophthora lateralis*, has resulted in substantial mortality within its native range, and many managers have considered it not to be a suitable candidate for reforestation because of this disease. The US Forest Service and Bureau of Land Management have established a program at the Dorena Genetic Resource Center (Dorena GRC) to screen for genetic resistance to Port-Orford-cedar root disease; this program oversees breeding to produce resistant seed for reforestation and restoration (Sniezko 2006). In 2002, three outplanting sites were established by the Dorena GRC with forest industry cooperators to evaluate the growth and disease resistance of 9 families from this program. This report covers growth, survival, and damage for those sites through plantation age 8.

Materials and Methods

Seed from the disease resistance program at Dorena GRC was used in this study. The parent trees originated from natural stands and are represented as rooted cuttings in orchards or clone banks at Dorena GRC. Some seedlots used in this trial were full siblings from controlled crosses, and others were the result of wind pollination among many parents in the containerized orchards. The nine seedlots (families) were chosen to cover the full range of mortality (from 0 to 100%), which resulted from a seedling root-dip test using *P. lateralis* in a greenhouse trial (R. Sniezko, unpublished results). Six families had maternal parents from low elevation (<800 m) areas in the south Oregon coast (JR13 Breeding Zones 110, 125, and 210; see Dorena GRC 2006 for breeding zones), and three families had maternal parents from higher elevation (>800 or >1,200 m) areas more inland in southern Oregon or northern California (JR13 Breeding Zones 350, 440, and 450). Seedlings were grown in 164-mL containers at Dorena GRC for 1 year.

The outplanting locations (Table 1) were in Coos County, Oregon (one site 8 km northeast of Bandon), and Curry County, Oregon (two sites 16–22 km east of Sixes). The surface soil texture at all locations was silt loam. Port-Orford-cedar had been present in the previous stands at all sites, but root disease had not been documented. Port-Orford-cedar root disease spreads by movement of spores in water or soil (attached to animal feet or equipment) or by transport of diseased stock. At each outplanting location, four blocks were established. Families were randomly assigned to rows in each block, with 8–10 seedlings per family in each block. The planting locations were viewed prior to planting; areas considered unsuitable for planting (e.g., old skid road or large stump) were skipped, and the row was extended as necessary to plant all the seedlings. Site preparation treatments were applied prior to planting; photographs taken shortly after planting provided evidence that competing vegetation was well controlled at all sites at that time. Disease-free seedlings were outplanted by hand in spring 2002.

After outplanting, the sites were visited periodically and surveyed for mortality (causes ascertained in most cases by pathologists) and other damage. Trees were measured for height 4 growing seasons after outplanting and for height and diameter (at 1.3 m) 8 growing seasons after outplanting.

Results

Survival and Damage

Survival was excellent at the Tent Prairie (99%) and Coquille River (97%) outplanting sites, with most trees in all families surviving to the 8-year evaluation. Survival was much lower (60%) at the

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This article uses metric units; the applicable conversion factors are: centimeters (cm): 1 cm = 0.39 in.; meters (m): 1 m = 3.3 ft; kilometers (km): 1 km = 0.6 mi; milliliter (mL): 1 mL = 0.061 in.^{3} (dry), = 0.27 fluid dram (liquid).