Major research effort saves prized Oregon tree

by David Stauth

CORVALLIS, Ore. â€“ A 50-year effort by Oregon State University and the U.S. Forest Service has succeeded in identifying Port Orford cedar trees that are immune to a deadly tree fungus that once devastated their populations.

The findings will open the door to a broad-scale recovery of this valued tree species, experts say.

â€œThis is probably the best success story weâ€™ve ever had in overcoming a pathogen of forest trees, which is a very difficult thing to do,â€• said Everett Hansen, an OSU professor of botany and plant pathology. â€œAt least some of our trees now have complete immunity to this pathogen. Never before have we been able to come this far, this fast. The results are fairly dramatic.â€•

An attractive tree with white, decay-resistant, fine-grained wood, Port Orford cedar is native to the Coast Range of southern Oregon and northern California. It once was considered the most valuable conifer in North America and was the basis of a $40 million annual export industry, mostly to Japanese markets. The beautiful wood at some points in its history commanded more than 10 times the price of Douglas-fir.

Those markets, and many or most of the trees, are largely gone now, victims of an invasive fungus called Phytophthora lateralis, which first appeared in this region in the 1950s. No one knows where the soil-borne fungus came from, but it ravaged Port Orford cedar populations, infecting the inner bark of their trunk, literally â€œgirdlingâ€• the tree and preventing nutrient flow.

Of the trees that were infected, almost â€“ but not quite â€“ 100 percent of them died. And from the very few survivors, OSU and Forest Service researchers began a long, painstaking project to identify resistant seedlings, growing and testing them for the ability to survive a challenge by this fungus.

The early returns were looking promising up to 10 years ago, and now scientists say they are confident they have Port Orford cedar trees that are essentially immune to the fungus â€“ at least, until the fungus mutates or increases its virulence.

â€œIt would be nice to just declare victory and say weâ€™re done, but the fight between trees and pathogens is like an arms race,â€• Hansen said. â€œSo far, this fungus has not significantly mutated or changed its virulence, but in an evolutionary sense weâ€™re just looking at the blink of an eye. We expect the fungus to mutate, and we need to be ready when that happens.â€•

Because of the concern about fungal mutation, Hansen said, researchers are continuing to breed a large number of trees that have a slightly different genetic makeup and varying degrees of resistance to the fungus. They are counting on that biodiversity to help protect the trees if â€“ more likely, when â€“ the fungus changes, especially in a forest environment.

â€œFor purposes of recovery of this tree in a natural forest setting, we donâ€™t want a monoculture,â€• Hansen said. â€œThat might be fine for now, but could mean we would lose all the trees with a slight mutation in the fungus. In an open, natural setting, lots of Port Orford cedar trees with greater levels of genetic biodiversity will be our first line of defense.â€•

On the other hand, private industry is already taking advantage of the research accomplishments to bring Port Orford cedar back to the ornamental landscape. Monrovia Growers is using a clone of Port Orford cedar, selected at OSU, which is virtually immune to the fungus to produce trees that can be sold for individual plantings in a home, garden or business setting. In the past, many variants of size, color, branching and foliage made Port Orford cedar a very popular landscaping tree.

Decades ago, there was a significant commercial timber and export industry based on Port Orford cedar. Recovery of that may be more problematic, because much of the sales then were from national forest lands, most of which now have few timber sales of any type, let alone a high-value tree such as this. Long-term silviculture of Port Orford cedar on private lands may be possible, Hansen said, although the continued risk of fungus mutation will be a concern.

Much of this work has been funded by the USDA Forest Service, with about $800,000 in grants to OSU over the past decade. Forest Service geneticist Richard Sniezko has been a key collaborator in the studies, and Forest Service seed orchards near Dorena, Ore., are producing most of the fungus-resistant trees.

Port Orford cedar originally evolved in parts of Oregon and California, where some soils were sufficiently toxic with heavy metals that they killed many other tree species. Itâ€™s shade tolerant and fire resistant, and can fill an important ecological niche in some old growth and riparian ecosystems.

Resistant seed and seedlings for forest use are available through the Oregon Department of Forestry.

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