Eradication of 'sudden oak death' disease is no longer possible in California

Over the last two decades, California and the federal government have faced harsh criticism for failing to take stronger actions to stop a highly contagious disease that has killed millions of trees along coastal regions from Big Sur to portions of Oregon.

Now, a new computer modeling study suggests that the “sudden oak death” epidemic, which emerged in 1995, has grown too big and is spreading too fast to eradicate statewide.

The analysis is the first to integrate knowledge of the pathogen with topography, weather and resources like government budgets to predict the likely effects of various management strategies over such a large area -- in this case, California’s 163,707 square miles of land.

The results are somewhat hopeful: Because the epidemic's growth rate increases with its size, focusing on restoring and treating small, local forests is now the most practical and cost-effective option for managing the destructive fungus, *Phytophthora ramorum*.

The findings were published Monday in the Proceedings of the National Academy of Sciences.

“At this point, we’re going to have to learn to live with it, and try to slow its spread with local management efforts and lots of experimenting,” said UC Davis ecologist Richard C. Cobb, who worked on the study

with colleagues from North Carolina State University and the University of Cambridge in England.

“We won’t be able to avoid much of the ecological impacts of losing all these trees,” he said. “But there is still time to avoid the worst possible outcomes of this epidemic by prioritizing trees that are most at risk, and taking steps to protect them.”

The team's computer models predict that sudden oak death will accelerate in California after 2020. “This will be driven by the pathogen reaching the northwestern coast [of the state], where large regions of continuous host and suitable weather conditions facilitate spread,” they wrote in the study.

Billions of tanoak and oak trees spread over 50 million acres of land are at risk, they added.

“The only treatment shown to be effective in reducing pathogen prevalence at the landscape scale is removal of host species," according to the study.

This strategy has been used in the United Kingdom but is rarely used in North America. The only exceptions are attempts in Humboldt County, Calif., and Curry County, Ore., Cobb said.

The fungus, which is related to organisms that caused the Irish potato blight in the 1840s, was first identified in California in 2000, after a group of Mill Valley homeowners asked horticulturalists for help in determining why dozens of tanoaks on their properties had suddenly died.

Unlike other tree diseases with symptoms that begin with a branch or limb and then spread, sudden oak death immediately involves the whole tree.

Young shoot tips of branches wilt, leaves and twigs die and a dark red sap bleeds from the lower portion of the trunk. New suckers grow from the trunks of some trees, but fail to survive.

Weakened by the fungus, stricken trees are finished off by infestations of tiny ambrosia and oak bark beetles.

Particularly susceptible are tanoaks, trees revered by Native American tribes for their acorns, and once a major source of tannin used for processing leather.

But tanoaks hold little commercial value for foresters because of their crooked growth and porous wood grain -- a major reason why the disease didn’t attract more attention when it was first detected.

In 2002, UC scientists confirmed that two of California’s most commercially valuable trees -- coast redwoods and Douglas firs -- had been infected with the fungus. That raised the stakes for the timber industry significantly.

Government funds were increased to fight the disease statewide, and the two types of trees were made subject to state and federal quarantine rules governing the movement of plants and tree products

affected by sudden oak death.

At that time, according to the modeling study, the disease was perceived to be a potentially serious threat, but there was sufficient data available about the pathogen and its spread to contain it.

“However, the cost in 2002 would have been very high, and practical implementation would have required unprecedented cooperation among agencies and landowners,” the researchers wrote.

By 2014, the epidemic had grown too big and was spreading too fast to control, according to the study.

A version of the model has been calibrated to help devise strategies for managing the disease in the United Kingdom, where it is ravaging stands of larch trees.

UC Davis ecologist David M. Rizzo, who also worked on the study, said the results of the analysis are crystal clear.

“When it comes to the arrival of new diseases, our computer modeling conveys a powerful message,” he said. “Jump in with both feet, or face the consequences later on.”

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