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Sudden oak death spreading fast, California's coastal forests facing devastation

Peter Fimrite
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Matteo Garbelotto, director of the UC Berkeley Forest Pathology and Mycology Laboratory, examines the trunk of a coast live oak that is infected with sudden oak death near Centennial Drive in Berkeley.

Photo: Photos by Paul Chinn / The Chronicle

It is the forgotten killer when compared to our increasingly frequent climate calamities, but the virulent pathogen known as sudden oak death remains active and is spreading death so fast it could destroy California's coastal forest ecosystem, UC Berkeley scientists

in 16 counties in Northern California.

Millions of coast live oak and tan oak trees have withered and died over the past quarter century, leaving acres of kindling for wildfires, but the outbreak this year was one of the worst. Oak trees have historically been abundant in California and southwestern Oregon, with hundreds of millions of them stretching all the way to Baja California.

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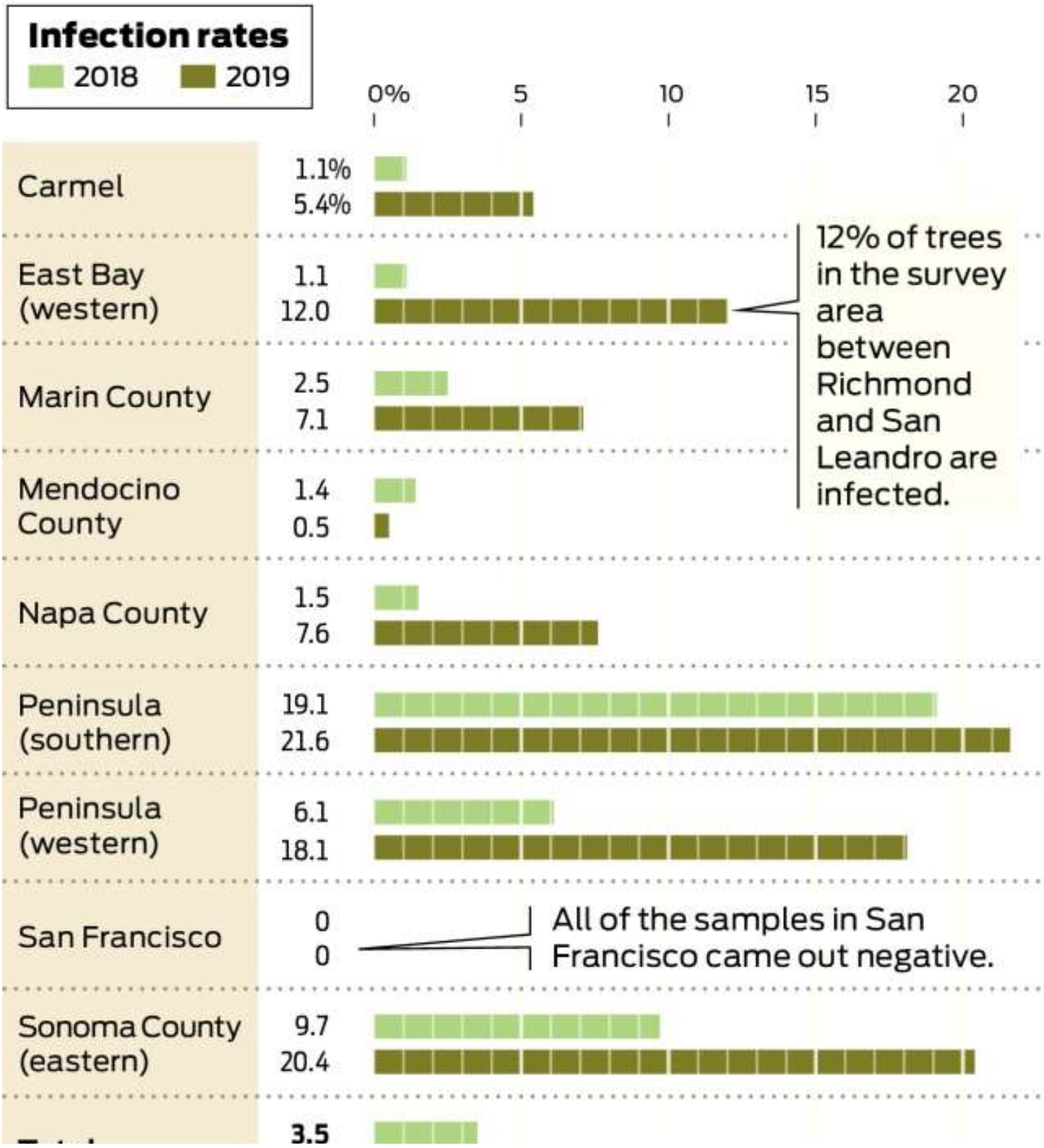
The rate of trees infected almost doubled in 2019 — from 3.5% to 5.9% — and was 10 times higher in some places compared with the 2018 survey, said Matteo Garbelotto, the director of the UC Berkeley Forest Pathology and Mycology Laboratory, which tested leaf samples taken by 422 volunteers.

Infections were found in all the well-known hotbeds, like Marin and Sonoma counties, the East Bay, Big Sur and the Santa Cruz mountains. But the 12th annual survey detected more of the pathogen this year in virtually every location. That's mainly because the disease spreads faster in the kind of wet weather that hit California last winter, Garbelotto said.

"There was a significant increase in infection rates over last year, but that's not totally surprising because we had a lot more rainfall," Garbelotto said. "But it was a surprise to see them all at once. It's telling us we are entering a different phase of the disease, where the organism isn't really establishing itself in new areas, but is showing itself more when weather conditions are favorable."

This year's survey of sudden oak death throughout Northern California found that total infection rates nearly doubled compared with last year and were 10 times higher in some areas.



Sudden oak death is an exotic disease that was discovered in Mill Valley in 1995. It now exists in forests and wildlands in 14 California counties and in Curry County, Ore., just across the state border.

It kills oak trees, including California's signature tree — the live oak — and there are 107 susceptible host plants, including such common garden ornamentals as camellias and rhododendrons. Although some hosts are sickened, they do not always die from the fungus-like ailment. Instead, these plants, bushes and trees help spread the deadly spores.

The samples, taken every year during what organizers call "SOD blitzes," are coordinated by neighborhood and community groups. They represent the state's first citizen-based attempt to combat an invasive environmental blight using science.

The volunteers collect leaves from California bay laurels, which are the biggest transmitters of the affliction, known scientifically as Phytophthora ramorum, and the Berkeley laboratory tests them for infection. The spores from the disease accumulate on the leaves, scientists say, so wherever there are a lot of bay laurels there are usually dead oaks nearby.

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from sea level to 5,000 feet — are the trees that are being obliterated.

That is of particular concern to Native American tribes like the Kashaya, in Sonoma County, and Karuk, near the Klamath River, who consider tan oaks sacred. Besides harvesting their nutritious acorn nuts, the native people to this day use specific trees for traditional ceremonies.

Tan oaks have been steadily dying, even in dry years, according to Garbelotto. Researchers estimate that 50 million tan oak trees have died from the disease. The trees, which can grow up to 100 feet tall, have been wiped out in portions of Big Sur, Sonoma Mountain, Jack London State Park, China Camp State Park and Marin Municipal Water District watershed lands near Mount Tamalpais.

It is a problem, Garbelotto said, because tan oak acorns provide food for at least 38 different animals, including 11 types of rodents, four bird species, deer, bears and racoons. The trees themselves provide habitat and shelter for insects, birds, reptiles and mammals. Biologists are concerned that the loss of so many trees will change the microclimate of the redwood forests where tan oaks are an understory tree.

Dead and dying oak trees also make wildfires hotter and cause them to spread more quickly. A 2017 study by Garbelotto's laboratory found that 37% of the trees sampled in Sonoma County, where the Wine Country fires raged later that year, were infected by sudden oak death.

"Our fear that the disease was going to have a devastating impact on our forests is happening," Garbelotto said. "In fact, it's worse than we thought."

Of the trees tested this year, 1,732 were symptomatic. Most notable, Garbelotto said, is the estimate, extrapolated from thousands of samples, that 12% of the trees in the survey area between Richmond and San Leandro are infected. That's compared with 1% last year.

More than 21% of the trees between Redwood City and Los Altos Hills are believed infected, according to the study. The infection rate also doubled in Sonoma County and

The dark color on a coast live oak tree trunk indicates that it is infected with sudden oak death.
Photo: Paul Chinn / The Chronicle

Although it was found this year mostly in locations where it had been detected before, new outbreaks were found in El Cerrito, Kensington, Berkeley and farther south along the border between Monterey and San Luis Obispo counties, he said.

The best news, Garbelotto said, is that all the samples in San Francisco came out negative. That means outbreaks detected in the Presidio and Golden Gate Park — tracked in previous years to nursery and ornamental plants — have been eradicated by gardeners who improved plant management and monitoring.

But, if anything, the disease is getting more complicated. Scientists have identified four different strains, much like different forms of the influenza virus. All detections in California have so far been one strain, believed to have originated in Southeast Asia, while a totally different strain from Europe has been found in Oregon.

Forest pathologists are determined to keep the two mating types apart for fear that they could breed — technically known as genetic recombination — and create an even more aggressive strain. Unfortunately, Garbelotto said, one of the detections this year was in Jedediah Smith Redwoods State Park, in Del Norte County, closer to the Oregon infection, and the second strain, than researchers have ever seen it.

The European strain is known to infect different types of trees than the California version, including beech and larch trees. There is no telling what the two strains combined would do, and scientists aren't eager to find out.

"In Europe it has killed thousands and thousands of larch trees, a big conifer," he said, "so my big worry would be Douglas fir trees, possibly also redwoods."

This was the first year the lab screened the samples for the different strains, all part of an effort to track the wily killer's movements and involve citizens in the battle to stop the mysterious and illusive pathogen that is changing California woodlands and forests.

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