



Diseased trees turning orange in the hills of Joaquin Miller Regional Park in January 2021. (Photo by John Brega)

Nature News

Disease Outbreak Appears to be Killing Bay Area Trees

by *Eric Simons*

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A mass tree dieback has spread through the East Bay hills and Peninsula over the last several months, affecting both native and nonnative trees. Though plants of all kinds in California are showing the stress of an extremely dry winter, in at least one tree species, the blackwood acacia, the dieback seems to be the work of fungal pathogens, said UC Berkeley forest pathologist [Matteo Garbelotto](#).

Karen Paulsell and John Brega, volunteers with the group [Friends of Sausal Creek](#), have documented stressed or dying acacias, eucalyptus, Monterey pines, coast live oaks, and toyons, as well as large stands of withered French broom and coyote brush throughout Joaquin Miller Regional Park, Leona Heights Park, and Dimond Canyon. Mark Silva, a ranger

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south watershed, which he said is the worst outbreak in bay trees that he's seen in 32 years in the district. He says bay trees are ordinarily "bulletproof." "Hopefully it's not something serious that's going to kill them," Silva said. "I've never seen anything bug a bay tree."

Susan Frankel, a biologist with the US Forest Service Pacific Southwest Research Station, said she went out to look at the acacias in Leona Heights Park and the severity reminded her of another catastrophic disease outbreak decades ago. "I've worked for the last 25 years on sudden oak death," she said. "I had not seen a problem as bad as what I saw in Leona Heights since the early days of sudden oak death."



Diseased trees in the hills of Joaquin Miller Regional Park in January 2021. (Photo by John Brega)

Frankel said scientists are still trying to understand the extent of the dieback, as well as the number of tree species and individual trees affected. The Forest Service typically uses flyovers to photograph and map forest outbreaks, but she said the flights have been delayed by COVID-19 precautions. She said the service hopes to have answers about the geographical range and number of individual trees affected in six months.

Brega said he first saw eucalyptus trees dying back along the Sunset Trail in Joaquin Miller Regional Park last summer. A regular park visitor who often pulls weeds and removes hazardous vegetation, he said he remembers looking up and recognizing that something was wrong.

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at the trees, and people would say, 'what's going on?' I'd say, 'Notice the eucalyptus trees dying?' 'No.' 'Notice it now?' And they'd look up and say, 'Oh my god!'"



Thinning, stressed eucalyptus trees in lower Joaquin Miller Park in January 2021. (Photo by John Brega)

Around the same time, Paulsell was documenting a separate problem involving the acacias. Volunteer May Chen sent Paulsell a picture of a diseased tree from near the [Bridgeview pollinator garden](#). When she was able to go and see, she was struck by the change. "I've only been out paying this much attention to nature for 20 years but I've never seen anything like those blackwood acacias turning that shade of brilliant orange," she said.

The first eight months of the 2020-2021 rainfall year constitute one of the driest starts on record in the Bay Area, and the last two years together are on track to be the second driest two-year stretch dating back to 1850 in San Francisco, according to data from [Golden Gate Weather Services](#) meteorologist Jan Null. Last year was also [the warmest ever recorded in California](#). But the nature and spread of the tree dieback made researchers suspect more than just drought as the killer.

"My gut feeling at the beginning was, the scale of the mortality, the numbers, the fact it was happening all over the place, was not enough for just drought and the environment to be driving it," Garbelotto said. "It had to be something amplifying that signal. These plants obviously are stressed, but there must be something else."

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if it was caused by a new pathogen, or by the new behavior of an already present pathogen. Garbelotto said he decided to focus just on the acacias to keep the project manageable. Using tissue samples from diseased trees from sites at the Carquinez Strait, Leona Heights, Diamond Canyon, and San Mateo County, he isolated two fungal pathogens that were present in every sick tree: *Diaporthe foeniculina* and *Dothiorella viticola*.



Dying acacias in Leona Heights in October 2020. (Photo courtesy US Forest Service)

At this point, Garbelotto said, the picture looks clear for the acacia. Though it would be hard to prove for sure without an experiment to infect a healthy acacia with the fungi, Garbelotto said the story that the dieback is driven by those two pathogens “makes a lot of sense.” Both fungi are native to California, Garbelotto said, and not picky about host plants. Scientists have found *Dothiorella* **attacking California citrus** trees, causing cankers, lesions, diebacks, and gumming. Species in the *Diaporthe* genus **infect fruit and ornamental trees worldwide**, including citrus, avocados and ficus. Both fungi are endophytic, meaning they live within their host, often for years, before emerging to cause disease. It’s an effective life strategy, Garbelotto said, that means they’re always ready to take advantage of a stressed tree.

“They’re very smart organisms,” he said. “When the time comes they’re the first ones there. They have the pole position. Front row and ready. This is their winning strategy. But once they start becoming aggressive, they are aggressive.”

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until the trees weakened from the heat and dry conditions of 2020 and 2021. Garbelotto said it's also interesting that many of the trees suffering right now are invasive non-natives like the acacias, which aren't suited to Mediterranean climates. Acacias and eucalyptus both grow in thick stands that leave less water available in a dry year and facilitate the spread of disease. It's like putting a bunch of tired people on an airplane with one person who has a cold, Garbelotto said — “everyone gets the cold.”

“We created the situation by letting these plants get too dense, planting them where they don't belong,” he said. “They get too dry, the extreme rainfall in 2017 probably really increased the infection rate dramatically in the Bay Area, and now we're seeing the result of that.”



A satellite image of acacia die-off in Oakland in October 2020. (Courtesy US Forest Service, Forest Health Protection depicting Geoeye and Worldview satellite imagery)

The other question is what to do about the dead and dying trees. In the midst of a record dry stretch, the last thing anyone wants is extra flammable kindling piling up around the region. But Garbelotto said land managers also have to be careful. Pathogens spread from the diseased wood and detritus, so moving it around could just further the problem. Ideally, he said, you could cut out dead trees and burn them or compost them to kill the fungi.

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Most of the trees are on land managed by the East Bay Regional Park District, East Bay Municipal Utilities District, San Francisco Public Utilities Commission, and city of Oakland. Silva, the EBMUD ranger, said between the expense of removing them, the risk of spreading disease and the naturalness of death, the district might not be able to intervene.

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“We can’t do much,” he said. “We can do stuff around the interfaces, remove dead fuels. But same with sudden oak death, we just let it occur. Trees die all the time, it’s sad and all that, but unless it’s near neighborhoods we basically just live with it.”

Further complicating the situation, Frankel said, is that it’s often hard to tell if a tree is dying or actually dead, especially with eucalyptus. Sometimes they can look dead for months before suddenly resprouting, or stump sprouting.

“Trees take quite a long time to die,” she said. “You have to be really careful. But certainly there’s a very widespread decline, a dieback, and some mortality is fair to assume.”

About the Author

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Eric Simons is the digital editor at Bay Nature and author of [The Secret Lives of Sports Fans](#) and [Darwin Slept Here](#).