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Citizen science helps predict risk of sudden oak death emerging infectious disease

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Crowdsourced science helped predict the path of a deadly plant disease over a six-year period, demonstrating the contributions that trained citizen scientists can make in large-scale geographic tracking projects. That's the conclusion of a study of sudden oak death monitoring in California, published today in Frontiers in Ecology and the Environment.

"Sudden oak death is the Ebola of the plant world, the most serious disease threat to nonagricultural plants," says lead author Ross Meentemeyer, director of the Center for Geospatial Analytics at North Carolina State University. The disease, which has killed millions of oak and tanoak trees in California and Oregon, can infect more than 100 susceptible host plants and can spread from nursery stock to residential landscapes.

Starting in 2008, University of California, Berkeley researchers expanded their sudden oak death monitoring efforts exponentially, thanks to 1,600 trained volunteers who collected leaf samples from trees in metropolitan and urban-wildland areas.

"We were able to get data from backyards in the Bay Area, along with other undersampled locations," says Meentemeyer, who specializes in geographic information system analysis. "That data was used to develop accurate computer models for the disease's spread, showing that properly trained and educated citizen scientists can collect data that's just as reliable as that of professionals."

The crowdsource approach could be adopted for other large-scale research projects, from tracking wildlife populations to fighting human disease outbreaks.

Accurate predictions about sudden oak death's spread allowed scientists to target treatments to the most vulnerable areas, says Matteo Garbelotto, a UC Berkeley extension specialist and adjunct professor who directs the Forest Pathology and Mycology Laboratory. Follow-up evaluation showed that trained citizen scientists were as effective as experts in identifying and collecting diseased tree leaves, whether or not they reported having a professional background in science.

The annual Sudden Oak Death Blitz, which includes extensive publicity during peak periods for the disease, involves high school students, homeowners, tree specialists, firefighters, teachers and others.

"To answer many science questions, we need the efforts of a large number of people - and the general public can help," says Sam Scheiner, National Science Foundation director for the NSF-NIH-USDA Ecology and Evolution of Infectious Diseases Program, which funded the research. "This study shows that asking local residents to report on the location of outbreaks of sudden oak death can provide critical information. The result is a better understanding of the spread of this serious plant disease."

Citation: Ross K. Meentemeyer, Monica A. Dorning, John B. Vogler, Douglas Schmidt, and Matteo Garbelotto "Citizen Science Helps Predict Risk of Emerging Infectious Disease" May 1, 2015, Frontiers in Ecology and the Environment

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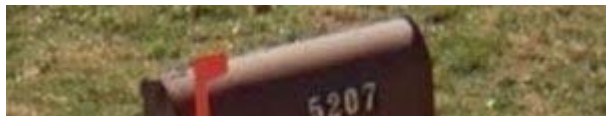- Allowed HTML tags: <a> <em> <img> <strong> <object> <cite><p>
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