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OPINION

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OP-EDS

FRIDAY, OCTOBER 4, 2019

Citizen science making a difference for California



VIVIAN DU/STAFF

BY [MATTEO GARBELOTTO](#) | SPECIAL TO THE DAILY CAL

LAST UPDATED 2 DAYS AGO

The term “citizen science” has become increasingly popular among the public and the research community. Citizen science is any program in which nonscientists, mostly volunteers, are recruited and trained to participate in a scientific study. Despite its increasing popularity, scientists and funding agencies are still split on the true merits of citizen science. One side claims that citizen science is mostly just a way to engage and inform the public on a variety of issues. The other side further believes that citizen science is a unique and extremely cost-effective opportunity to generate high-quality scientific data that can be used to test hypotheses, formulate predictive models and fill

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current gaps in knowledge. I firmly stand with those on the second side.

The tasks of a well-designed citizen science program should be socially or environmentally relevant, interesting, and fit the skill set of the participants and the training provided. Volunteers must be treated as peers, and the results of their efforts should be shared promptly to ensure continued engagement of the participants. For the last 12 years, I have been running a successful citizen science program called SOD blitzes, which aims to monitor the spread in California of the infectious exotic microbe *Phytophthora ramorum*.

This microbe is responsible for the devastating tree disease known as sudden oak death, or SOD. As of 2018, SOD has killed more than 50 million trees on the west coast of the United States, mostly in California. SOD can't be easily cured, but it can be prevented. Unfortunately, prevention is costly, difficult, and typically only done when the microbe — normally unable to move more than a few hundred yards per year — has arrived in a neighborhood. The disease is in fact extremely patchy; its distribution changes on a yearly basis and discrete infestations can be found in 15 coastal counties in California. Every year, we recruit volunteers to help us survey coastal California during the springtime, when symptoms of the disease are the most obvious. SOD Blitzes is a grassroots effort made up of more than 20 training sessions and collection events, which are called SOD blitzes, locally organized by collaborators in different key locations across the state.

In 2019 alone, 433 people surveyed about 18,000 trees and collected 9,000 samples from approximately 2,000 plants displaying SOD symptoms. All samples are tested for the presence of the microbe at UC Berkeley, and every year in the fall, the results are made public on the web through SODMAP and the free app SODMAP Mobile. These results have become instrumental to alerting residents of the arrival of the microbe in their neighborhoods so that preventive action can be taken in a timely way. In the 12 years of their life, the SOD blitzes have engaged more than 4,000 volunteers, and the results — often published by newspapers — have been accessed by more than three million people.

These numbers alone should convey the scale of societal benefits of citizen science programs like the SOD blitzes, in which a significant yet limited number of participants generate data of great relevance for the entire population of the state. I dare to say a program like this goes well beyond being a simple outreach and educational program. We have demonstrated this to the scientific community by using crowdsourced data collected by volunteers to generate two predictions for the spread of SOD published in two peer-reviewed journals. One such model turned out to be more reliable than any other model generated using traditional research data.

Tree-care specialists and homeowners have come to regularly use SODMAP or the SODMAP app to decide whether to start a SOD prevention program or not. There are two cases, however, that further highlight the value of the SOD blitzes. In the early 2010s, an isolated SOD outbreak was identified during the SOD blitzes in the town of Atherton. Based on those findings, several infected trees were removed and Atherton has been SOD-free ever since.

Just recently, the SOD blitzes identified the first SOD outbreak ever in Del Norte County. This finding will have regulatory implications only when the California Department of Food and Agriculture confirms the finding, but that may take a while, considering that we believe this may be an extremely young outbreak, affecting only a handful of trees. I have been working on SOD for 20 years and I simply cannot recall such an early detection of SOD. Normally tens or hundreds of trees are infected before an outbreak becomes visible and may be identified. The finding thus underlines the power of a sizeable citizen science program. Hopefully, the Atherton example may be followed



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COLUMNISTS

and infected trees can be removed. While fully eradicating the microbe may be impossible, tree removal could significantly slow down the further spread of the disease.

Two SOD blitzes in San Luis Obispo County, still officially uninfested, annually engage tens of volunteers to monitor a large number of trees in the hopes of catching the arrival of SOD early on, and the Del Norte case shows that it can be done. I hope to change the mind of those who believe that volunteers cannot generate solid scientific data or relevant novel data. In that regard, I encourage everybody to read the results presented in our 2015 article documenting that the proficiency of volunteers was equal to or higher than that of professionals. In the often cash-strapped research world, working with volunteers in a well-crafted citizen science program may be the only way to fill critical gaps in knowledge and to provide relevant data. The SOD blitzes have done exactly that for California, and we Californians should be deeply indebted to the hundreds of volunteers who have participated in the program.

Matteo Garbelotto is a UC Berkeley adjunct professor and UC Berkeley Forest Pathology extension specialist.



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