

Enlisting youth citizen scientists to combat Zika by collecting mosquito eggs

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Female mosquitoes can transmit parasites when they feed. Credit: CDC

Going out of your way to attract mosquitoes seems like the last thing anyone would want to do, but that is exactly what the national Invasive Mosquito Project is hoping volunteers will do in the name of public health.

Managed through the United States Department of Agriculture, the Invasive Mosquito Project aims to track the spread of invasive container-

breeding mosquitoes – those whose females lay eggs in the standing water that collects in containers such as vases, rain barrels, and even pool or boat covers. The introduction of many non-native species often coincides with the introduction of new pathogens, and mosquitoes are notorious for playing host to a number of these, including the viruses responsible for West Nile, dengue and most recently in the news, Zika.

Project volunteers do not collect adult mosquitoes—that would be far too risky. Instead, volunteers collect mosquito eggs; a much safer approach, and just as effective for studying species distributions.

Developed by Kansas State University [public health](#) graduate student Ashley Thackrah and USDA Research Entomologist Lee Cohnstaedt, the project is a continuation of the North American Mosquito Project's 2011-2012 species survey. This nationwide survey, conducted by over 100 professionals, was the first to collect mosquito samples during a single mosquito season.

"It was a great effort and produced a lot of very valuable data that is still being mined," said Cohnstaedt. "But we also thought, how can we do better?"

By better, he means creating a long-term, self-sustaining sampling program that not only tracks mosquito populations, but also adds an education component for [students](#) and creates a generation of individuals better informed about the risks mosquitoes pose.

Recently, the Invasive Mosquito Project launched an ambitious new goal: to integrate their program, and its affiliated curriculum, into twenty percent of the nation's high school classes for 20 years. If successful, researchers would have a multi-year data set from which to create dynamic maps of North American mosquito populations. Such information would show how mosquito populations grow and change

over time and how populations spread geographically. Understanding this would help public health officials as they try to forecast potential health risks.



Equipment for this project is as simple as a cup, a paper towel and some water.
Credit: Lee Lee Cohnstaedt

While anyone can participate, and they do encourage anyone to help, Thackrah and Cohnstaedt are particularly interested in getting young people involved.

"We know [young people](#) are more receptive to adopting new behaviors and they in turn will help teach generations after them," said Cohnstaedt. "But perhaps even more exciting to me is how this project provides students with a multitude of learning opportunities and a more genuine flavor of what scientific research is."

The task itself is simple. Place a cup partially filled with water outside. Lay a dark paper towel inside the cup and return in one week to count how many mosquito eggs are on the paper towel.

"A lot of the students expect it to work the first time around," Cohnstaedt said, but unexpected problems often crop up, such as cups being toppled by wind, animals drinking the water, or other insects invading the cups. Yet these unexpected problems, small though they may be, show students that science is rarely a straightforward endeavor and offers them students a real-world opportunity for unstructured and independent problem solving.

The project also allows students to generate and test their own hypotheses about attracting mosquitoes. Students in one Kansas classroom, for example, predicted that the murky water from a class aquarium would be a sure bet for attracting mosquitoes. They tested their assumption, using water from an aquarium in a collecting cup. The result? Not a single mosquito egg. While the students' initial prediction did not bear out, in testing it they learned more about mosquito behavior: [mosquitoes](#) don't lay eggs in water where fish might be present because many fish eat mosquito eggs and larvae. Avoiding water that reeks of fish increases the odds those eggs and larvae will survive.

Solving problems and testing ideas makes for a more enriching educational experience. An online forum allows students, teachers and other volunteers to share their experiences with others. Teachers can find a multitude of classroom resources online as well. And while the project is mainly geared to high school students, the Invasive Mosquito Project team is happy to provide tips on adapting the project for younger students.

Reflecting on her experience developing the project, Thackrah said she's proud to have worked on a project that gives kids the opportunity to

practice science as scientists, and hopes it may inspire some to pursue science as a career. "I didn't have these kinds of experiences as a student, doing projects where I got to collect my own data and where the data was meaningful," she said. "I have really enjoyed being able to give something different and very valuable to students who want to learn, who want to do research."

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