Controlling Zika mosquitoes may be 'lost cause'

Liz Szabo, USA TODAY*6:11 p.m. EDT May 3, 2016*

A USA TODAY motion graphic showing how to prevent your home from becoming a breeding ground for the Aedes mosquito, known to spread the Zika virus. Source: National Environmental Health Association Ramon Padilla Berna Elibuyuk and Liz Szabo, USA TODAY

Aedes aegypti, the exotically named mosquito that transmits the Zika virus, defies almost everything Americans think they know about mosquitoes, which means that even experts know very little about how to control them.

Think mosquitoes live in the woods? Not this one.

The female Aedes aegypti — the ones that bite — hang out in your house, preferably under your bed. If door and window screens block her entrance into your house, she will settle down under your patio furniture. And unlike the mosquitoes that most cities target for destruction each summer, the Aedes aegypti doesn't swarm or bite at night.

With the prospect of Zika spreading the continental U.S. this summer, experts say the country must map exactly where the species lives and urgently rethink its standard operating procedures for controlling mosquitoes. Protecting Americans from Zika virus is critical. The virus causes

devastating birth defects and is strongly linked to a variety of serious neurological conditions, including a form of paralysis called Guillain-Barre syndrome.

"There is no good method for killing these mosquitoes that's being used on a widespread basis," said Michael Doyle, executive director of the Florida Keys Mosquito Control District.

Following a Dengue Fever outbreak in 2009 the Key West Mosquito Control District ramped up their domestic mosquito control program to target the Aedes aegytpi mosquito which is also the mosquito most responsible for spreading the Zika Virus. Kelly Jordan, USA TODAY

Recent efforts to kill the Aedes aegypti, which also transmits the viral diseases dengue and chikungunya, "don't give us much reason for optimism," said Scott Weaver, director of the Institute for Human Infections and Immunity at the University of Texas Medical Branch in Galveston. "In the near term, it's a lost cause."

Eradication is also stymied by a lack of information about exactly where these mosquitoes live, Weaver said. Knowing which cities and counties they inhabit could help communities target their efforts.

"In a lot of places in the U.S., people don't know if Aedes aegypti is there or not," Weaver said.

Many communities are using mosquito-killing methods that don't work on the Aedes aegypti, Doyle said.

While aerial spraying or fogging from a truck after can kill the Culex mosquitoes that can spread West Nile virus and or the "nuisance" mosquitoes that annoy people but don't spread disease, these methods have no effect on the Aedes aegypti, Doyle said.

“We cannot spray our way out of this," said Umair Shah, executive director of Harris County, Texas, Public Health and Environmental Services, at a national summit on Zika preparedness in April.

U.S. fight against Zika mosquito depends on local effort

A neighborhood is sprayed for mosquitoes in April in McAllen, Texas. *(Photo: John Moore, Getty Images)*

Aerial spraying won't "get to the mosquito that's sitting on the wall of your bedroom," said David Dyjack, executive director of the National Environmental Health Association.

In Brazil, which is contending with a widespread outbreak of Zika, officials have tried a number of approaches to controlling the Aedes aegypti, said Mauro Martins Teixeira of the Federal University of Minas Gerais in Brazil. "We haven't done anything to dramatically change their numbers," he said.

So what's the best way to kill the Aedes aegypti? "The bottom line is that we don't know how," said Peter Hotez, dean of the National School of Tropical Medicine at Houston's Baylor College of Medicine.

History repeats itself

If the U.S. lacks the know-how to kill Aedes aegypti, that's partly because the country hasn't mounted a serious campaign against it in half a century, Hotez said .

Aedes aegypti, also known as the "yellow fever mosquito," has caused outbreaks throughout U.S. history. But the country abandoned efforts to eradicate it after yellow fever no longer seemed like a threat, said Gordon Patterson, a professor at the Florida Institute of Technology in Melbourne, Fla.

Latin America had more success, at least for a time. In the 1950s and 1960s, the Pan American Health Organization launched an aggressive campaign against the Aedes aegypti and eliminated the species from much of South America, Doyle said.

Many of the countries embraced the powerful pesticide DDT, which the U.S used to fight malaria in the South. Authoritarian leaders of some Latin American countries also used heavy-handed techniques to force their way into people's homes and yards, Weaver said.

Mosquito-control teams sprayed "every possible water-holding container in every yard, inside and out, with DDT three to four times a year, using an army of men armed with hand-held sprayers," Doyle said. "They also sprayed walls and closets inside houses."

As mosquito-control efforts in Latin America wound down, the Aedes aegypti surged back, Doyle said. Today, the species is again present throughout Latin America. So are the diseases it spreads.

Modern pesticides are considered much safer than DDT — which was banned in 1972 because of it harmed the environment — but they've been used so heavily that many mosquitoes are resistant to them, Doyle said.

Giraldo Carratala, left, a Miami-Dade County mosquito-control inspector, shows Ana Palacio the standing water in her trash can, where mosquitos are breeding. *(Photo: Joe Raedle, Getty Images)*

Searching for new strategies

With so few effective tools to kill Zika mosquitoes, officials in the Florida Keys are working with the Food and Drug Administration to launch a trial using genetically engineered male mosquitoes, whose larvae die before adulthood. The approach is experimental and controversial, however, and the trial may not be ready to launch until next spring, Doyle said. Even if the trial begins sooner, it will be too small to make much of a dent in the Florida Keys' mosquito population, he said.

For the moment, the most effective strategies to defeat the Aedes aegypti are labor intensive, Hotez said. Instead of covering large areas with trucks and planes, mosquito-control workers will have to use hand-held chemical sprayers and remove containers of standing water where like

mosquitoes breed. The U.S. should also consider providing window screens to those who don't have them, he said.

Giraldo Carratala, a mosquito-control inspector in Miami-Dade County, Fla, uses a hand-held fogger to spray pesticide to kill mosquitoes. *(Photo: Joe Raedle, Getty Images)*

Studies show that one of the best ways to kill Aedes aegypti is through indoor spraying with chemicals that stick to walls and kill any insects that land there, Doyle said. Such spraying is rarely done in the U.S. Americans today might be reluctant to allow mosquito-control teams to spray inside their homes, even during an outbreak, he said.

"It means going house-to-house to either do the spraying or teaching residents to do the spraying themselves," Hotez said. "It's going to be challenging, which is one reason why we haven't done this before in the United States."