

Mutant mosquitoes fight dengue in Cayman Islands

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Scientists have released genetically modified mosquitoes in an experiment to fight dengue fever in the Cayman Islands, British experts said Thursday.

It is the first time genetically altered mosquitoes have been set loose in the wild, after years of laboratory experiments and hypothetical calculations. But while scientists believe the trial could lead to a breakthrough in stopping the disease, critics argue the mutant mosquitoes might wreak havoc on the environment.

"This test in the [Cayman Islands](#) could be a big step forward," said Andrew Read, a professor of biology and [entomology](#) at Pennsylvania State University, who was not involved in the project. "Anything that could selectively remove insects transmitting really nasty diseases would be very helpful," he said.

Dengue is a potentially fatal mosquito-borne disease that can cause fever, muscle and joint pain, and hemorrhagic bleeding. More than 2.5 billion people are at risk and the World Health Organization estimates there are at least 50 million cases every year. There is no treatment or vaccine.

Unlike malaria, which is also spread by mosquitoes, dengue outbreaks are unpredictable and bed nets are of limited use because dengue-spreading mosquitoes also bite during the day.

Researchers at Oxitec Limited, an Oxford-based company, created sterile male mosquitoes by manipulating the insects' DNA. Scientists in the Cayman Islands released 3 million mutant male mosquitoes to mate with wild female mosquitoes of the same species. That meant they wouldn't be able to produce any offspring, which would lower the population. Only female mosquitoes bite humans and spread diseases.

From May to October, scientists released batches of genetically mutated male mosquitoes in cages three times a week in a 40-acre (16-hectare) area. By August, mosquito numbers in that region dropped by 80 percent compared with a neighboring area where no sterile male mosquitoes were released.

Luke Alphey, Oxitec's chief scientific officer, said with such a small area, it would have been very difficult to detect a drop in dengue cases. But their modeling estimates suggested an 80 percent reduction in mosquitoes should result in fewer dengue infections.

For years, scientists have been working to create mutant mosquitoes to fight diseases like malaria and dengue, which they say could stop outbreaks before they start. But, others suspect it could be an environmental nightmare.

"If we remove an insect like the mosquito from the ecosystem, we don't know what the impact will be," said Pete Riley, campaign director of GM Freeze, a British non-profit group that opposes genetic modification.

He said mosquito larvae might be food for other species, which could starve if the larvae disappear. Or taking out adult mosquito predators might open up a slot for other insect species to slide in, potentially introducing new diseases.

Humans have a patchy track record of interfering with natural ecosystems, Riley said. In the past, such interventions have led to the overpopulation of species including rabbits and deer. "Nature often does just fine controlling its problems until we come along and blunder into it."

Oxitec's Alphey said their genetically modified mosquitoes can't permanently change the ecosystem because they only last for a generation. But to stamp out dengue in endemic areas like Asia and South America, billions of the special-order mosquitoes would likely be needed to stifle their wild counterparts.

Yeya Toure, who leads the World Health Organization's team on Innovative Vector Control Interventions, called the Cayman Islands trial promising and said it's worth continuing the genetic modification experiments.

He said genetically altered mosquitoes aren't meant to replace existing tools like insecticides, but to compensate for their limitations, like when mosquitoes develop resistance.

Read said creating mutated mosquitoes might actually be the least invasive way to control dengue. By keeping a lid on the mosquito population via genetic modification, Read said entire ecosystems would be spared the toxic effects of indiscriminately spraying pesticides.

He said the bigger problem would be selling the idea of genetically altered mosquitoes to the public. In the Cayman Islands, officials said they worked closely with the local community and encountered surprisingly little resistance.

"We still have people who don't believe in vaccines," Read said. "How are we going to convince them it's OK to let scientists release genetically

altered [mosquitoes](#) into the wild?"

More information: <http://www.oxitec.com>

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