

Scientists explain spread of chikungunya vector

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The tropical disease chikungunya began twisting Western tongues in July when the first locally transmitted case was reported in Florida. Spotted in the Caribbean just last year, the disease spread explosively throughout the Americas in 2014. Chikungunya's arrival in Panama prompted Smithsonian scientists to examine how human activity spreads its mosquito vector and the serious implications this has for disease ecology everywhere.

Chikungunya causes fever, fatigue and joint swelling and is transmitted by the Asian tiger mosquito, *Aedes albopictus*. The tiger mosquito also spreads dengue, so the study published in *PLOS Neglected Tropical Diseases* also holds a cautionary tale for dengue-eradication programs, which primarily target another mosquito, the virus's main vector, *Aedes aegypti*.

Panamanian health authorities first detected the tiger mosquito in the Central American nation in 2002 and kept tabs on its spread from Panama City. This comprehensive data—uncommon in many tropical nations—coupled with years of mosquito surveys by Smithsonian Tropical Research Institute (STRI) post-doctoral fellow and co-author José Loaiza, showed that the tiger mosquito relies on road networks to disperse. Loaiza is also a researcher at INDICASAT, a leading Panamanian scientific research institute.

"The vector is not moving organically across the landscape," said Matthew Miller, another STRI postdoc who was lead author of the study.

To stem the vector's spread, the authors recommend health authorities fumigate vehicles at checkpoints already set up throughout Panama to prevent screwworms, flesh-eating fly larvae that attack cattle, from spreading from Colombia to North America. Checkpoint fumigation could prevent the tiger mosquito from reaching the Azuero Peninsula and Bocas Del Toro, in Panama, where it has not been detected.

In May, *Ae. aegypti* genetically modified by the British firm Oxitec to render offspring unviable were released in a Panama City suburb with the backing of Panama's government. The modified mosquitoes are expected to greatly reduce *Ae. aegypti* populations.

But the experiment may have unwittingly launched a game of ecological whack-a-mole. Given *Aedes* ability to disperse through road networks, populations of *Ae. aegypti* could reestablish without continuous release of modified mosquitos. Another possibility is that the [tiger mosquito](#) could fill the niche that *Ae. Aegypti* occupied. Coincidentally, the first locally transmitted case of chikungunya appeared in Panama that same month.

"The two mosquito species are so ecologically similar that, by depressing *Aedes aegypti* populations, the chances that *Aedes albopictus* is going to competitively displace it may increase," said Miller. "This research is relevant to the study of introduced disease vectors everywhere."

More information: Miller MJ, Loaiza JR (2015) Geographic Expansion of the Invasive Mosquito *Aedes albopictus* across Panama—Implications for Control of Dengue and Chikungunya Viruses. *PLoS Negl Trop Dis* 9(1): e3383. [DOI: 10.1371/journal.pntd.0003383](https://doi.org/10.1371/journal.pntd.0003383)

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