

Transgenic mosquitoes pass on genes to native species

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Millions of genetically modified male *Aedes aegypti* mosquitoes were released over more than two years in the city of Jacobina, Brazil. Credit: Ari Rios [CC BY-SA 3.0 (<https://creativecommons.org/licenses/by-sa/3.0/>)]

Transgenic mosquitoes released in Brazil in an effort to reduce the population of disease-bearing insects have successfully bred and passed on genes to the native mosquito population, a new Yale research study

published Sept. 10 in the journal *Scientific Reports* has found.

Tens of millions of genetically modified male *Aedes aegypti* mosquitoes were released over more than two years in the city of Jacobina, in Bahia, Brazil. Females who mated with males carrying these modified genes were supposed to be unable to produce viable offspring, thereby reducing people's risk of contracting a host of dangerous diseases such as Zika, dengue fever, and yellow fever. However, samples of native mosquitoes harvested in the region and analyzed at Yale revealed that some members of the [native population](#) had retained genes from the transgenic release strain.

"The claim was that genes from the release strain would not get into the [general population](#) because offspring would die," said senior author Jeffrey Powell, professor of ecology and evolutionary biology. "That obviously was not what happened."

Powell stressed that the mixing of the transgenic strain and native [population](#) poses no known health risk.

"But it is the unanticipated outcome that is concerning," he said. "Based largely on [laboratory studies](#), one can predict what the likely outcome of the release of transgenic mosquitoes will be, but genetic studies of the sort we did should be done during and after such releases to determine if something different from the predicted occurred."

Mosquito-borne diseases are a huge public health problem in developing countries and is of increasing concern in more developed areas, such as the southern United States. In an effort to curtail use of insecticides in combating the threat, the Brazilian government purchased a new strain of transgenic mosquitoes originating from a strain that came from Cuba and was crossed with another from Mexico, which was developed by an English biotech company. Laboratory tests had shown the females that

mated with the genetically modified males only produced offspring about 3 percent of the time, and the survivors were feeble and were believed to be unable to reproduce.

But the Yale study showed not only that offspring from the [transgenic mosquitoes](#) had reproduced but the population of mosquitoes in Jacobina is now a mix of their original types plus those from Cuba and Mexico, likely leading to a more robust population, according to the researchers. And the population of [mosquitoes](#), after initial decline, had rebounded about 18 months after introduction of genetically modified males. Powell speculated that females had begun to avoid mating with modified males, fueling a rebound in population.

More information: Benjamin R. Evans et al. Transgenic *Aedes aegypti* Mosquitoes Transfer Genes into a Natural Population, *Scientific Reports* (2019). [DOI: 10.1038/s41598-019-49660-6](https://doi.org/10.1038/s41598-019-49660-6)

Provided by Yale University

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