

Genetically Engineered Mosquitoes



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The British company Oxitec has released millions of genetically engineered (GE) mosquitoes in the Cayman Islands, Brazil and Malaysia. Now Oxitec wants to release its mosquitoes in the Florida Keys in 2012.¹

The company claims these altered mosquitoes will battle dengue fever.² However, basic safety questions remain unanswered, and the limited information made public by Oxitec raises serious concerns about what they are not telling the public.

FACT: The technology has not been proven safe for the environment or public health.

Oxitec Myth: GE mosquitoes are safe for humans and the environment.

Oxitec's GE *Aedes aegypti* mosquito contains the company's patented technique for controlling survival of the insect offspring. Oxitec claims this mosquito will reduce the population of wild mosquitoes and stifle the prevalence of dengue fever.³ The company claims that its GE mosquitoes are "sterile."⁴ Actually, the mosquitoes do reproduce, but they pass on a lethal gene that theoretically causes the offspring to die before reaching adulthood.⁵ However, Oxitec's data show that 3 to 4 percent of the GE mosquito offspring survive, with unknown impacts on the environment.⁶

Oxitec claims that the technique is safe because only males are released, rather than the biting and disease-spreading females.⁷ But GE male and female mosquitoes would need to be identified and separated.⁸ Since mosquito pupae are tiny, sorting them for a large-scale release leaves plenty of room for error.⁹ The company expects each batch to contain less than 1 percent females.¹⁰ This means that biting GE female mosquitoes could be released, with unknown impacts.

Lab-bred GE mosquitoes can evolve resistance to the lethal gene.¹¹ And, the fitness of the GE and wild mosquito progeny is unknown.¹² Other serious questions include whether bites from female GE mosquitoes could cause allergies and whether diseases transmitted by mosquitoes could evolve to become more dangerous.¹³

Even if these futuristic bugs successfully wipe out the entire population of the target *A. aegypti* mosquito, another species will likely fill the ecosystem void. The Asian tiger mosquito — one of the world’s more invasive species—is also a known vector for dengue fever and other diseases. Allowing tiger mosquitoes to become the dominant species would only make a new dengue fever carrier more prevalent.¹⁴

FACT: Local communities have not been adequately involved in Oxitec’s releases of GE mosquitoes and have not had the opportunity to give informed consent.

Oxitec Myth: Communities have been involved in the approval process.

In Malaysia, Oxitec conducted a public consultation, which raised serious concerns from several non-profits and the opposition political party, but the release proceeded anyway.¹⁵ In the Cayman Islands trial, the public was told that the mosquitoes were sterile without also being told that they were genetically engineered.¹⁶

Oxitec has been sluggish in publishing results from its trials. In fact, the only published results are from the first 2009 Cayman open-air release, just released in October 2011.¹⁷

FACT: There is currently no clear federal authority over GE mosquitoes in the United States.

Oxitec Myth: Regulatory authority is accountable and will keep the public safe.

In 2009, the U.S. Food & Drug Administration’s (FDA’s) Center for Veterinary Medicine issued guidance on the regulation of GE animals, in which it announced its intent to collaborate with other agencies on future guidance for how best to regulate GE

insects.¹⁸ This guidance, however, is still pending. Food & Water Watch has contacted local, county and state health and environmental authorities in Florida, as well as federal agencies, seeking information about the reported Oxitec application to release GE mosquitoes in the Keys. No information was received from the FDA or the Centers for Disease Control, and the U.S. Department of Agriculture stated that it sent a letter of no jurisdiction to Oxitec, because the agency does not have the authority to regulate the insects.¹⁹ While it does appear that Oxitec has a pending application, no agency appears to know who is actively responsible for considering it.²⁰

A Keys Mosquito Control District biologist has said the agency is “satisfied” with safety, and the district is ready to press ahead with a release, perhaps as early as spring 2012.²¹

A lack of regulatory oversight means that no one is watching out for the unintended consequences on human health or the environment. The stakes are high, and we need more information before any further releases of GE mosquitoes are permitted.

FACT: Oxitec (“Oxford Insect Technologies”) is a for-profit company with something to sell.²²

Oxitec Myth: Oxitec’s primary aim is to help cure dengue fever.

Oxitec’s “products” are a suite of nine GE insects designed to address various health or agricultural concerns.²³ But, Oxitec has competition in the dengue fever control business. Australian research points to a type of common bacteria that naturally infects mosquitoes, which can stop dengue transmission.²⁴ Perhaps that is why Oxitec is rushing to lay claim to the solution, with another experimental release of its GE mosquitoes.



The federal, state or local government should not approve the release of these unregulated and experimental mosquitoes in South Florida. Communities near the proposed test areas should not have to be guinea pigs for a trial run of uncontrolled, manipulated pests. GE mosquitoes are not the answer to fighting dengue fever.

Take Action: Tell Florida’s Secretary of Agriculture not to allow the release of GE mosquitoes. Contact him at Adam.Putnam@freshfromflorida.com or (850) 488-3022. For more information, go to www.foodandwaterwatch.org.

Endnotes

- 1 Morgan, Curtis. “Key West Mosquito Control Could Go Sci-Fi.” *Miami Herald*. November 11, 2011.
- 2 Harris, Angela et al. “Field performance of engineered male mosquitoes.” *Nature Biotechnology*. October 30, 2011 at 1.
- 3 Oxitec. “Our Products – Lead Aedes Strain.” Accessed on November 22, 2011. Available at www.oxitec.com/our-products/lead-aedes-strain/.
- 4 Oxitec. “Our Business.” Accessed on November 22, 2011. Available at www.oxitec.com/our-business/.
- 5 Harris et al. October 30, 2011 at 1.
- 6 Phuc, Hoang Kim et al. “Late-acting dominant lethal genetic systems and mosquito control.” *BMC Biology*, vol. 5, iss. 11. March 20, 2007 at 3.
- 7 Pollack, Andrew. “Concerns Are Raised About Genetically Engineered Mosquitoes.” *New York Times*. October 30, 2011.
- 8 *Ibid.*; Shelly, Todd and Don McInnis. “Road test for genetically modified mosquitoes.” *Nature Biotechnology*, vol. 29, iss. 11. November 2011 at 985.
- 9 *Ibid.*
- 10 Harris et al. October 30, 2011 at Online Methods.
- 11 Pollack (October 30, 2011).
- 12 Shelly and McInnis. November 2011 at 985.
- 13 Benedict, Mark et al. “Defining Environmental Risk Assessment Criteria for Genetically Modified Insects to Be Placed on the EU Market.” Scientific/Technical Report Submitted to EFSA. Accepted for Publication on September 10, 2010 at 98; Wallace, Helen. “The Danger of Genetically Modified Mosquitoes.” *Scientific American*. October 24, 2011.
- 14 Trivedi, Bijal. “The Wipeout Gene.” *Scientific American*. November 2011 at 75.
- 15 Wallace (October 24, 2011); Jaya, Petaling. “Pahang PAS slams Bentong mosquito release.” *Free Malaysia Today*. January 28, 2011; Consumers Association of Penang. [Press Release.] “CAP and SAM: Revoke approval for field trial of GM mosquitoes.” January 17, 2011; Trivedi. November 2011 at 74.
- 16 Wallace (October 24, 2011).
- 17 Harris et al. (October 30, 2011); Pollack (October 30, 2011).
- 18 U.S. Food and Drug Administration. Center for Veterinary Medicine. “Guidance for Industry 187: Regulation of Genetically Engineered Animals Containing Heritable Recombinant DNA Constructs.” Final Guidance. January 15, 2009 at 6.
- 19 Food & Water Watch correspondence with U.S. Department of Agriculture’s Animal and Plant Health Inspection Service.
- 20 Morgan, C. “Key West Mosquito Control Could Go Sci-Fi.” *Miami Herald*. November 11, 2011.
- 21 *Ibid.*; Wadlow, Kevin. “Release of genetically altered mosquitoes delayed.” *Florida Keys Keynoter*. January 4, 2012.
- 22 Wallace (October 24, 2011); Oxitec. “Our Products.” Accessed on December 19, 2011. Available at <http://www.oxitec.com/our-products/>
- 23 Oxitec. “Our Business – Our Pipeline.” Accessed on November 22, 2011. Available at www.oxitec.com/our-business/our-pipeline/.
- 24 Oxitec. “Pest control expert identifies RIDL as a potential breakthrough.” Oxitec Newsletter. September 2011. Accessed November 22, 2011. Available at www.oxitec.com/our-news/newsletters/september-2011-newsletter-2/; Hoffmann, A.A. et al. “Successful establishment of Wolbachia in Aedes populations to address dengue suppression.” *Nature*, vol. 476. August 25, 2011 at 454.

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