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OPINION

Before genetically modified mosquitoes are released, we need a better EPA

If risks are being assessed, it is largely happening behind closed doors between technology developers and EPA employees.

By **Natalie Kofler and Jennifer Kuzma** Updated June 22, 2020, 3:00 a.m.



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While the attention of the American public has rightfully been focused on the COVID-19 pandemic, its associated racial disparities, and broader issues of structural racism, the US government made a serious public health decision — one that could affect our health

and our environment for generations to come.

Last month, the US Environmental Protection Agency approved the release of genetically modified mosquitoes. Under a 2-year [Experimental Use Permit](#), a company called Oxitec has been granted permission to release over 1 billion genetically modified mosquitoes across 6,600 acres in Florida and Texas.

Oxitec hopes to demonstrate through field trials that their latest GM mosquito strain can reduce local populations of *Aedes aegypti* – the mosquito species that transmits dengue fever, yellow fever, chikungunya, and the Zika virus. When males of this [GM mosquito strain \(OX5034\)](#) are continually released to mate in the wild, they pass on a lethal gene to their female offspring that causes female larvae to die before they can develop into biting adults. Male mosquito offspring survive, but male mosquitoes don't bite and without viable females, the population should eventually collapse.

EPA approval of the release of this new GM mosquito is just the first step toward Oxitec selling its proprietary mosquito to US mosquito-control boards, and by extension US taxpayers. [Oxitec intends to deploy its GM mosquitoes in and around the Florida Keys and near Houston](#). If the appropriate local authorities agree, millions of GM mosquitoes could be released into the wild every week starting this summer.

With our combined scientific and policy expertise, neither of us is anti-genetically modified organisms. We eat GM foods and believe that GM technologies can have significant benefits to public health – but only if they are used safely and fairly. The environmental introduction of the first GM mosquito in the United States is a landmark decision. Its public health, ecosystem, and societal risks and benefits should be carefully weighed.

In [a recent press release](#), Oxitec claims its strategy is a “safe” and “environmentally sustainable” way to control mosquitoes that transmit disease. Yet the EPA did not convene an independent, external scientific advisory panel to review Oxitec's claim; the agency's risk assessment was only made publicly available after their approval decision

and we know of no peer-reviewed articles on this particular GM mosquito strain.

Meanwhile, [GM mosquitoes are being introduced into uncontained, shared environments that people live in and depend on](#). The [EPA recently held a written public comment process that yielded over 31,000 comments](#) where some worried the impacts of GM mosquito suppression could threaten food webs and strain already vulnerable ecosystems. Others feared GM mosquitoes, or their genetic material, could integrate into the wild; GM-wild hybrid mosquitoes could prove more difficult to control or better at spreading disease. (Several years ago, [public meetings and a nonbinding referendum](#) took place in Florida over a different Oxitec mosquito strain. Residents of Key Haven, the site of proposed trials, voted against the release.)

Oxitec has trialed their second generation [GM mosquito in Brazil and succeeded in reducing local populations of *Aedes aegypti*](#). Given Brazil's high mosquito-borne disease burden — the country reported over [1.5 million probable cases of dengue fever in 2016](#) — the potential benefits of GM mosquitoes may outweigh their unknown ecological risks. Yet in the United States, dengue outbreaks are relatively rare, yellow fever has been eradicated domestically, and [231 of documented Zika virus](#) cases were caused by local mosquito transmissions, as opposed to those associated with travel. It is unclear whether the potential benefits of release in the United States (one could be chemical pesticide reductions) will outweigh the risks. These tradeoffs must be weighed in a public setting.

And herein lies our concern: Risks should not be assessed behind closed doors between technology developers and EPA employees. As designed, the EPA risk assessment process privileges private entities over the American public.

Several recommendations could be implemented to make the regulatory process more open, rigorous, and fair.

For starters, an external independent group of experts should be convened to review the first GM mosquitoes presented for release. To address the complexity of such a decision,

this group should consist of interdisciplinary experts representing diverse identities with expertise in ecology, genetics, vector biology, risk assessment, entomology, public health, ethics, and social science. External peer review is a cornerstone of good science and could ensure that all necessary risks are being addressed.

To ensure rigorous review, the EPA and other regulatory bodies must also fund independent third-party research on GM mosquitoes and their potential impact on US ecosystems and human health. Potential risks are too important to be left to corporations alone to research, and the American public needs to be assured that these decisions are made free of conflicts of interest.

Lastly, and perhaps most important, people who live in areas of release must be consulted for their specialized, on-the-ground knowledge and for their right to have input in decisions that will affect them. Last week, the Florida Department of Agriculture and Consumer Services [approved](#) the EPA permit for experimental release. Oxitec must now get approval from the Florida Keys Mosquito Control Board. An independent group should host public conversations through local community venues, and it must make sure that structurally marginalized perspectives are at the center of those gatherings. But local community input should be consulted at every stage of the regulatory process, not after permits have already been granted. And earmarked government funding should support these local deliberations, as well as measures to amplify underrepresented perspectives in environmental regulation and [biotechnology](#).

GMOs made with even more powerful genetic technologies like [CRISPR gene editing](#) and gene-drives are being created in the laboratory and considered for open-environmental release. The public needs to know that the risks and benefits of these decisions will likely impact us all, and certain communities even more so. The COVID-19 pandemic has made it clear that robust public health depends on informed communities who participate in collective actions. Release of GM mosquitoes is no different. For the health of ourselves, the nation, our planet, and future generations, environmental regulation of GMOs must be made more rigorous and just.

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