

Big Agriculture eyeing genetic tool for pest control

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A controversial and unproven gene-editing technology touted as a silver bullet against malaria-bearing mosquitos could wind up being deployed first in commercial agriculture, according to experts and an NGO report published Tuesday.

So-called "[gene drives](#)" force evolution's hand, ensuring that an

engineered trait is passed down to all or most offspring, and from one generation to the next.

If that trait is being male or female, for example, genetically altered specimens released into the wild could lead to the local extinction of a targeted species within a dozen generations.

For health campaigners battling malaria, which kills nearly half-a-million people—mostly in Africa—every year, and conservationists desperate to save island birds decimated by avian malaria and invasive rodents, gene drive seems almost too good to be true.

It just may be, say some scientists.

"The use of CRISPR-based gene drive could lead to an ecological cacophony," said Virginie Courtier-Orgogozo, a biologist at the Jacques Monod Institute in Paris, referring to the underlying gene-editing technique that has revolutionised the field.

"We could see every interest group in the agro-food industry editing the genome of those they call pests, spreading various mutations through gene drive and causing long-term effects on the ecological dynamics of ecosystems—along with the human populations depending on them," she wrote recently in the journal *EMBO Reports*.

Critics calling for a moratorium on the release of gene drives in the wild fear they could mutate, jump to other species, or spread far beyond target areas.

And yet, in the absence of national or international regulations, the technology could be used on large-scale farms or orchards within a few years.

Cherry picking

"Gene drive is headed toward agriculture," said Jim Thomas, research director at ETC Group, a Canadian-based NGO that tracks potentially dangerous bio-technologies, and lead author of a report on the technology's inroads into Big Agriculture.

In the United States, at least, it already has a foothold.

Associations representing the US citrus and cherry industries, for example, have commissioned tailor-made gene drives to combat the pests threatening their crops—and their bottom lines.

In January, the California Cherry Board noted "considerable progress" in developing a "functional" gene drive system for the invasive spotted wing fruit fly (*Drosophila suzukii*), which has devastated cherry, peach and plum orchards.

"Our plan it still to continue with caged trials and ultimately wild releases," the group noted in its annual review.

With funding from the cherry growers, scientists at the University of California in San Diego set up a pair of companies last year to commercialise gene drives, with one focused on insects and plants, and the other on engineering lab mice and possibly pet dogs.

Agri-chemical and GMO giants such as Monsanto-Bayer, Syngenta-ChemChina and Dow Dupont, meanwhile, are reportedly tracking the technology's emergence.

"Gene drives offer agribusiness new potential opportunities to generate income from the problems faced by farmers," Thomas said.

But with a new twist: rather than making plants pest-resistant, gene drive technology alters the pests, rendering them harmless or programming their extinction.

A temporary moratorium

That potential was clear early on.

One of the cornerstone patents—co-owned by Kevin Esvelt of Harvard University, often described as one of the inventors of gene drive—lists dozens of agricultural applications.

Esvelt has retreated somewhat from his initial blanket enthusiasm.

"Given recent history, it's clear that early commercial applications in agriculture would seriously jeopardise popular acceptance of the technology as a whole," he told AFP, noting that public health aims should take priority.

"A temporary moratorium on commercial applications of gene drive wouldn't be a bad idea."

The gene drive issue will be front-and-centre when the 195-nation UN Convention on Biological Diversity meets in Sharm el Sheikh, Egypt next month.

A preparatory meeting in July of the Convention's science and technology advisory board "was an almighty fight and circus around gene drive," said Thomas, a member of the board's Ad Hoc Technical Expert Group on Synthetic Biology.

A petition released on Tuesday, World Food Day, by nearly 200 civil society and small-farmer groups call for "a global moratorium on any

release of engineered gene drives," a position supported by numerous developing countries.

There is also a fairness issue for local communities in the regions where gene drives might be released, Thomas said.

"This isn't just about environmental impact, it's also about consent," he said by phone.

Gene drive technologies have been funded to the tune of several hundred million dollars by a handful of backers, including the US military, the Bill and Melinda Gates Foundation, India-based Tata Trusts, and the Facebook-backed Open Philanthropy Project.

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