

Gene drive mosquitoes: changing natural populations through genetic engineering

New Testbiotech video

17 September 2018 / Testbiotech has made a new video showing how 'gene drive' works. This new technology is capable of genetically engineering whole natural populations. It involves manipulating the genome of an organism in such a way that it becomes self-replicating in every generation thereafter. This enables the altered gene to spread rapidly throughout natural populations and either replace or eradicate them. The nuclease CRISPR-Cas has a decisive role in this context.

These mechanisms not only change genetic traits but also the pattern of inheritance. Genetic engineering is no longer a process carried out solely in laboratory conditions. It becomes a self-organising process outside of human control and can open up a whole new dimension of risk.

Initial preparations for the release of gene drive organisms are already underway. In August 2018, the government of Burkina Faso approved field trials with 10,000 genetically engineered mosquitoes as part of the "Target Malaria" project. If this goes ahead as planned, it would be the first release of genetically engineered organisms in Africa. The mosquitoes do not as yet carry a gene drive and are not meant to survive. The releases are intended to be a first step in promoting acceptance of this kind of research in the region.

Gene drives are also an issue for political decision-makers: in Germany there is ongoing political debate on safety standards in laboratories used for experiments with gene drive organisms. In November, the members of the Convention on Biological Diversity (CBD) will discuss internationally binding rules and regulations.

The new video shows a potential future scenario: the release of gene drive mosquitoes that are meant to persist and propagate in the environment. It is easy to distinguish known facts from fictional content from the way it is presented. Our video shows genetically engineered mosquitoes that can no longer transmit malaria. The goal is to replace natural populations of mosquitoes with those that are genetically engineered.

Our example touches on complex ethical questions. Combating malaria is certainly a pressing issue. However, uncontrolled releases of 'gene drive' organisms carry significant risks and, therefore, raise ethical questions about our responsibility for future generations. The video tries to explain this dilemma.

Testbiotech has already produced another video on non-browning mushrooms that are genetically engineered with CRISPR-Cas technology.

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Further information:

- Video clip: www.testbiotech.org/gentechnik-grenzen/videos
- Questions & answers page linked to the video clip: www.testbiotech.org/en/content/new-methods-genetic-engineering-gene-drive-mosquitos-testbiotech-background-17-9-2018
- Some background information on gene drive: www.testbiotech.org/en/limits-to-biotech/gene-drive/basic_paper