

GeneTip project results published in full

New publication on technology assessment of gene drives

27 April 2020 / The GeneTip research project was a joint enterprise carried out from 2017 until 2019 by the Universities of Bremen and Vechta, the University of Natural Resources and Life Sciences, Vienna and Testbiotech, Munich. The researchers focused on risks associated with the spread of newly designed genetically engineered organisms into the environment. In particular, the project examined plants and animals with a so-called gene drive. The results have now been published in full by the Springer Publishing Company in a book titled "Gene Drives at Tipping Points" (open access).

The project was funded by the German Federal Ministry of Education and Research (BMBF) and coordinated by the University of Bremen (project code 01LC1724). The published results give a detailed overview of the technical characteristics of gene drives as well as associated risks.

Gene drives are designed to spread genetically engineered organisms rapidly through natural populations. In populations with sexual reproduction, genetic characteristics are normally distributed with a 50% probability to the offspring. The gene drive mechanism, however, interferes with process of natural inheritance, aiming to pass on new genetic information to almost 100% of following generations. There are ongoing debates about using gene drives to combat insects such as mosquitoes and fruit flies, or rodents such as mice and rats. The aim is to suppress or eradicate the target species within a region, or to replace it with genetically engineered populations.

So far, in most cases, the aim has been to prevent as far as possible the spread of genetically engineered organisms. However, gene drive organisms are designed to persist and propagate in the environment within natural populations, potentially over an unlimited period of time. Furthermore, it has to be expected that unintended characteristics can emerge in following generations. In addition, a high degree of exposure means there needs to be a presumption of unforeseeable interactions with ecosystems. Therefore, comprehensive prospective technology characterisation and assessment of associated risks are vital.

GeneTip has shown that the technical and biological characteristics of the organisms, including their ability to persist and become invasive, are decisive for the dynamics of the targeted populations and their potential for gene flow to other species. In addition, there may be distinct interactions with the environment and the ecosystems in which the organisms propagate and spread.

The GeneTip results show that reasonable scientific concerns can be identified at an early stage of the technical developments. Uncertainties and limits of knowledge are high hurdles in regard to the precautionary principle, which can make it necessary to limit or prevent environmental releases.

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Further information: [Springer Book „Gene Dives at tipping points“ \(open access\)](#) [2]

[Website GeneTip](#) [3]

[German report on the results of GeneTip \(in German\)](#) [4]

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[1] <mailto:info@testbiotech.org>

[2] <https://link.springer.com/book/10.1007/978-3-030-38934-5>

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[3] <https://www.genetip.de/en/biotip-pilot-study/>

[4] http://www.genetip.de/wp-content/uploads/GeneTip_Endbericht.pdf

