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Research on gene drive technology can benefit conservation and public health

As a global community, we are facing life-threatening challenges that undermine our future, from catastrophic loss of biodiversity to acute public health threats.

Malaria cases are on the rise again after decades of progress, and fragile ecosystems are undergoing intensifying rates of extinctions. These challenges require new and complementary tools if we are to achieve the Sustainable Development Goals and the Aichi Targetsⁱ.

As the Convention on Biological Diversity (CBD) meets for the 14th Conference of the Parties (COP14) in Egypt in November, decision-makers from countries around the world will have an opportunity to reaffirm the importance of enabling research to support responsible innovation and evidence-based decision-making.

Closing the door on research by creating arbitrary barriers, high uncertainty, and open-ended delays will significantly limit our ability to provide answers to the questions policy-makers, regulators and the public are asking. The moratorium suggested at CBD on field releases would prevent the full evaluation of the potential uses of gene drive. Instead, the feasibility and modalities of any field evaluation should be assessed on a case-by-case basis.

Much of the progress we have made in the past century in improving the livelihoods and wellbeing of communities around the world is the result of increased knowledge acquired through scientific research. Science has not brought solutions to all our problems, but improved understanding and evidence have been key to progress. Innovations in vaccines, for example, have saved millions of lives: the 74% percent reduction in childhood deaths from measles over the past decade is a demonstration of the life-changing power of scientific researchⁱⁱ.

Gene drive is a well-established field of research. First observed in the 1920s in mice and *Drosophila*, gene drive is a naturally occurring phenomenon that has been the subject of investigation for many years. Recent advances in gene editing tools have allowed notable progress in the two years since gene drive was first discussed at CBD, helping deliver increased knowledge and greater understanding of the possible applications of gene drive, while shedding further light on its risks, limitations, and potential.

While these advances are important, there is still much more to be achieved before any gene drive organisms could be considered for regulatory evaluation. Key institutions, such as the African Union, have called for continued work in this field, emphasising the value of the opportunity and the need for informed case-by-case assessment of this technology by national authoritiesⁱⁱⁱ.

Scientists, alongside regulatory experts, funders and sponsors of the research, are working together to ensure research is carried out safely and responsibly, by building on previous experiences, using published policy and information, and putting in place monitoring and containment systems to prevent accidental releases^{iv} ^v. Ongoing discussions are also taking place to determine suitable conditions for field evaluations.

Member States can enable the Convention on Biological Diversity to be a platform for knowledge and experience sharing. We should not decide against the use of a tool before potential costs and benefits can be fully evaluated. We urge governments to ensure the decisions taken at the Convention on Biological Diversity's next meeting do not amount to a moratorium on gene drive research, but instead offer a balanced and constructive way forward for Parties to learn and monitor this field of research.

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ⁱ Bellard et al., (2016) "Alien species as a driver of recent extinctions" *Biology letters* vol. 12,2.
Spatz et al., (2017) "Globally threatened vertebrates on islands with invasive species". *Science Advances*,
Vol. 3, no. 10
WHO (2017) World Malaria Report
WHO (2015) Global Technical Strategy for Malaria 2016–2030
ⁱⁱ WHO http://www.who.int/immunization/diseases/measles/global_coordination/en/index4.html

ⁱⁱⁱ See for e.g., the African Union High Level Expert Panel report (2018) [Gene Drives for Malaria Control and Elimination in Africa](#) and the WHO Vector Control Advisory Committee (VCAG) [Report of the fifth meeting of VCAG](#) and [Report of the eighth meeting of VCAG](#) (2018)

^{iv} See for example:

- NASEM (2016) [“Gene Drives on the Horizon: Advancing Science, Navigating Uncertainty, and Aligning Research with Public Values”](#)
- Benedict et al., (2018) [Recommendations for Laboratory Containment and Management of Gene Drive Systems in Arthropods](#).
- James et al., (2018) [Pathway to Deployment of Gene Drive Mosquitoes as a Potential Biocontrol Tool for Elimination of Malaria in Sub-Saharan Africa: Recommendations of a Scientific Working Group](#)
- Akbari et al., (2015) [Safeguarding Gene Drive Experiments in the Laboratory](#).
- Emerson et al., (2016) [Principles of Gene Drive Research](#)

^v Reports and decisions informing the safe and responsible management of gene drive research have been published by, among others:

- Dutch National Institution for Health and Environment (RIVM)
https://www.rivm.nl/en/Documents_and_publications/Scientific/Reports/2016/februari/Gene_drives_Policy_report
- African Union decision July 2017 https://au.int/sites/default/files/decisions/33559-assembly_au_dec_642_-_664_xxix_e_1.pdf
- Australian Academy of Sciences <https://www.science.org.au/files/userfiles/support/documents/gene-drives-discussion-paper-june2017.pdf>
- Haut Conseil des Biotechnologies, France (2017) <http://www.hautconseildesbiotechnologies.fr/fr/avis/avis-relatif-a-lutilisation-moustiques-gm-dans-cadre-lutte-antivectorielle>
- Australian Office of the Gene Technology Regulator
<http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/Content/amendment%20proposals-1>

