News | 16.10.2018

New GM ‘eradication’ techniques pose grave threat to ecosystems

Why we need an international moratorium on so-called “gene drive”

Do you remember those US “radiation movies” from the 1950s and 60s, where mutated animals wreaked havoc, like in the now cult film *Them* (featuring James Whitemore and some very clever and scary giant ants)? The point that these films were making, apart from the inherent dangers of nuclear fission technologies, was that it is not wise to have mutated creatures spread into the environment because we cannot handle the impacts.

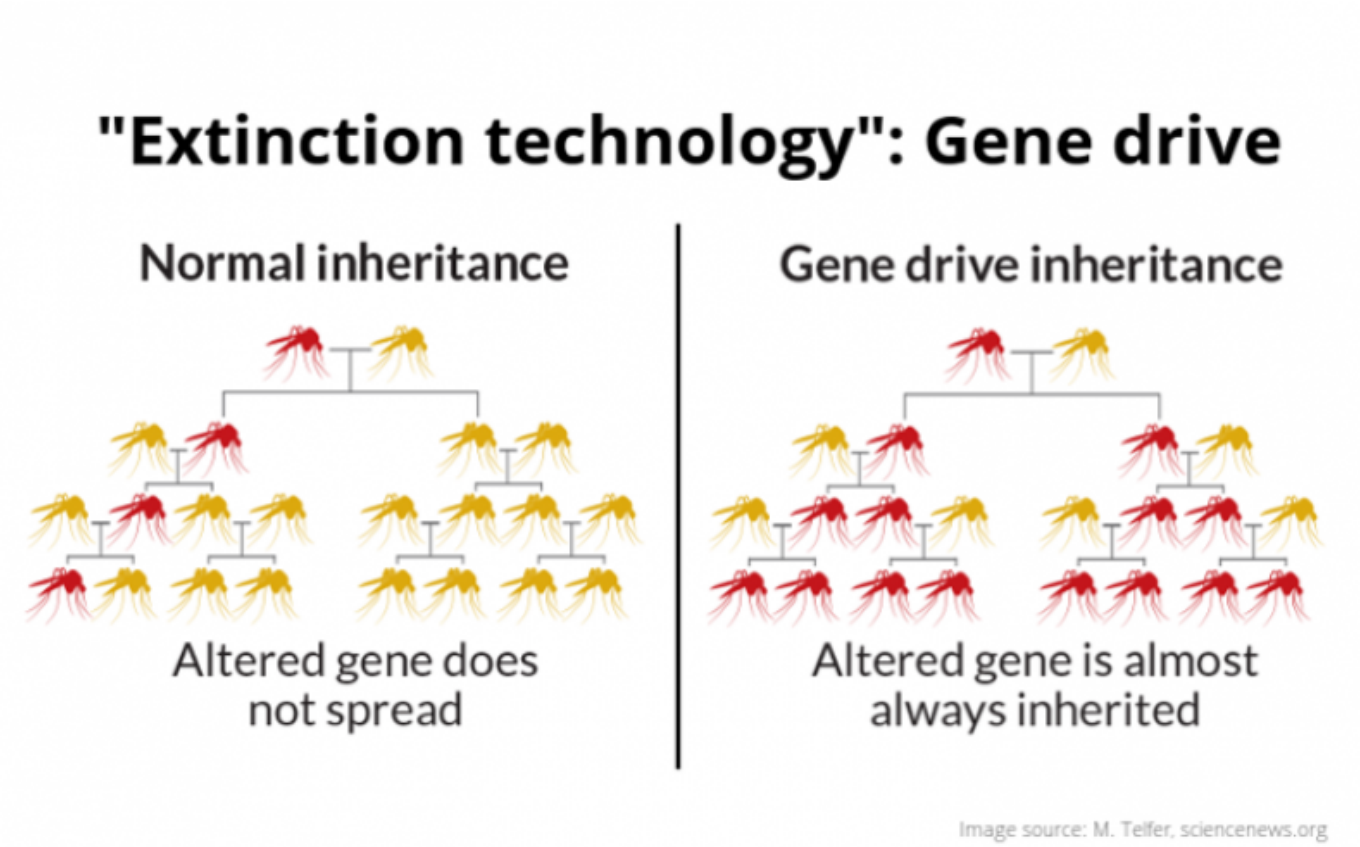
We can laugh about these movies now, but it is precisely in the same spirit that the EU GMO regulation[1] was built. Limiting contamination by GMOs and unaccounted spreading of genetically modified organisms in nature has always been the rule and one of the main aims of the regulation. The risks of these GMOs breeding with local wild or cultivated populations is the main focus of the biosecurity measures laid down in the EU texts. Obviously, we do not fear giant killer ants, but the deep impacts that the introduction of genetically modified organisms might have on ecosystems.

The European Parliament will vote next week on a call for an international moratorium on a new biotechnology called 'gene drive' that has the potential to eradicate entire populations. The amendment, which was tabled as a cross-party initiative led by the Green/EFA group, urges the European Commission to take a stand on this issue during the next Conference of the parties of the Convention on Biological Diversity.

Gene drive allows for modification of entire wild populations

Concerns around the contamination of natural populations seem to have been completely ignored in the development of this new technique, known as gene drive, which if unimpeded will enable humans to modify entire populations of living organisms in just a few generations. Gene drive allows for the bypassing of hereditary laws and the passing of a gene from one parent to almost all its descendants, whatever the genes of the other parent. In this way, it is, for example, possible to pass a female sterility gene through genetically modified males and - in theory - eradicate a whole population.

Proponents of this technique usually present extremely exciting possible uses like a reduction of the number of mosquitoes responsible for the malaria epidemic, or the eradication of an imported rat population that is endangering the ecosystem of New Zealand. These indeed sound great if we forget that the consequences could be dire.



Lessons from the past on the fragility of ecosystems

By definition, ecosystems are systems: if you modify or remove some parts of them, the whole system changes to account for it.

The sharp decline of the insect population in fields due to pesticide use has led to both the decrease of bird populations in rural areas and to the quick development of the acarian population that has filled the ecosystem niche left empty by insects. Acarians, such as mites and ticks, are also attacking crops and are much more difficult to fight.

As for removing an invasive species, let us remember that myxomatosis was spread voluntarily in the 1950s to reduce invasive rabbit populations and is still the number one cause of death in rabbit farming all over the world because of these experiments[2]. In both cases, the aim was met but was followed by extremely problematic consequences. There is no reason that the proposed uses of gene drive would not have the same kind of effects. What could be excused 70 years ago by the limited knowledge of the functioning of ecosystems and lack of previous experience should be seen as completely and utterly irresponsible if attempted today.

A call for an international moratorium is opposed by strong commercial interests

The risks of gene drive so blatantly outweigh the possible benefits that 200 global food movement leaders and organizations representing hundreds of millions of farmers and food workers NGOs have signed a call for an international moratorium on the release of organisms modified by gene drive into the environment. An increasing number of scientists are also raising the alarm, including, in a Frankenstein-esque twist, Kevin Esfelt, MIT, developer of the technique: "*We are walking forwards blind. We are opening boxes without thinking about consequences. We are going to fall off the tightrope and lose the trust of the public*."

What is frightening Professor Esfelt is that, still in its infancy, gene drive has already been appropriated by industry for all sorts of uses: the eradication of mosquitos (a field trial is already ongoing), agricultural uses (notably to reverse herbicide resistance developed by weeds), but also military uses, with massive investment from DARPA, the US Defence Advanced Research Projects Agency. These interests are now pushing hard for a total deregulation of the technique everywhere and opposing any restriction or assessment guidelines being developed at international level.

This question has been discussed for several years now in the framework of the UN Convention on Biological Diversity (CBD) and of the Cartagena Protocol on Biosafety and Nagoya Protocol on Access and benefit sharing, but without any results so far. This should not come as a surprise as it was discovered, through Freedom of Information requests, that the UN expert group process has been unduly influenced by a covert operation run by a Gates-funded lobby firm, and by a pro-biotech lobby platform named Public Research Regulation Initiative (PRRI).

- The Convention on Biological Diversity (CBD), known informally as the Biodiversity Convention, is a multilateral treaty. The Convention has three main goals including the conservation of biological diversity (or biodiversity); the sustainable use of its components; and the fair and equitable sharing of benefits arising from genetic resources.
- The Cartagena Protocol on Biosafety is an international agreement on biosafety as a supplement to the Convention on Biological Diversity, in effect since 2003. The Biosafety Protocol seeks to protect biological diversity from the potential risks posed by genetically modified organisms resulting from modern biotechnology.
- The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity is a 2010 supplementary agreement to the Convention on Biological Diversity (CBD). Its aim is a fair and equitable sharing of benefits arising from the use of genetic resources, thereby contributing to the conservation and sustainable use of biodiversity.

The EU needs to defend the precautionary principle

EU countries are participating in the debate, and they will very probably prepare a position before the next conference of the parties of the CBD, set to meet at the end of November 2018. The problem is who they will choose to represent them. During the last meeting in Cancun, countries including Sweden, the UK and the Netherlands, all notoriously pro GM, were appointed as leads for the EU position.

Even more problematic, is that Dutch official Boet Glandorf is a member of the PRRI's email group discussion list, and the freedom of information request made by the Brussels-based NGO, Corporate Europe Observatory, showed that she had been sending PRRI information and asking them for guidance on this issue.

The European Parliament has never broached the subject until now and has not been involved in the discussions. The first position of this institution on gene drive could be voted in the next plenary on 23 October. Indeed, a cross-party initiative led by MEPs from the Greens/EFA group have now tabled an amendment calling for a moratorium on gene drive to be inserted into the Parliament's resolution on the 14th meeting of the Convention on Biological Diversity.

The use of gene drive could destroy or deeply modify entire ecosystems. It is basic wisdom to take the time to stop, reflect and research before even considering commercial use for it. In the meantime, we could also consider other solutions within which to invest the billions of euros currently thrown into gene drive research.

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[1] As well as the Cartagena protocol at International level

[2] It was very recently discovered that myxomatosis was now also infesting hares

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