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News | 15.06.2017

New GMOs

Not as precise as advertised... and still useless

this is not a gmo

More precise, less risky, more efficient, less costly: that is how their promoters have been selling the idea of deregulating new biotechnologies to the legislators, both at EU and national level. These claims sound a lot like the ones that were made, falsely, 20 years ago concerning transgenesis (aka the most popular GMOs until now). Environmental NGOs and organic farmers have been opposing very strongly any deregulation and are calling for evaluation, traceability and labelling of these techniques and their products.

This debate has taken up again the centre stage after the Science Advice Mechanism (SAM), an advisory body for the EU Commission, published their long-awaited report on these new biotechnologies (also called “new breeding techniques”) a few weeks ago. The aim of the report was not to give any advice on

legislation, but to list, review and compare the different technologies used for plant breeding and selection, from conventional ones (not involving biotechnologies) to the most recent techniques of gene editing.

There is a lot to say about this report, both positive and negative. For example, we agree with the SAM when it highlights the importance of a case-by-case risk assessment of each organism modified with these techniques, because the risks will be different depending not only on the techniques used, but also which organism is modified (plant, animal, micro-organism...) and on the intended use (intended for food or feed or not, released in the environment or not...).

We are however more doubtful about other conclusions of the SAM's report. A central postulate of the report is that these new techniques, and especially gene editing techniques, provoke fewer of the so-called "unintended effects" - meaning unintended changes in the genome - than the current biotechnologies (like transgenesis or random mutagenesis). They conclude from that starting point that therefore, these techniques are cheaper, quicker to use, less risky than the current ones, and nearly impossible to trace. Almost as natural as natural plants and animals then...

But in fact this starting point is highly controversial among geneticists. Several scientific reports have found that all techniques intervening directly in the genome will have unintended effects however precise the modification or intended outcome. Indeed the simple fact of having to pass through the cell wall and access the genome, and regrowing the plant from a modified cell, will trigger a significant number of mutations. But a study published a few days ago in the highly respected scientific journal Nature Method[1] even goes further. It shows that CRISPR CAS 9 - the most promising and supposedly precise of the gene editing techniques - not only provokes a lot of unintended effects on modified mice, but that these unwanted mutations are not located where all the other researchers had been searching for them and that they are not random but always occur at the same places in the genome. This means there is something central in the functioning of this technique and its consequences that the geneticists have not yet understood. This is a very exciting field of research for them in the years to come, but it also proves that the technique is not yet mature enough to be used on living organisms intended to be released into the environment... and in our food.

In brief, these techniques are so new that the experts' understanding is too incomplete to be able to make judgements on their safety. Each new study is changing, sometimes spectacularly, the state of the debate (as is normal for subjects of cutting edge research). Let us recall that the same debate took place in the 1990s concerning transgenesis and that many assumptions, subsequently found to be absolutely false, were made then concerning the precision of this biotechnology.

We believe there are very good reasons to be prudent and to follow the precautionary principle. There is no good reason to deregulate these techniques when there is very well suited EU GMO regulation already in place. This is especially important as we don't actually need these techniques to select and breed useful seeds and animals adapted to farmers' needs and resilient to the ongoing climate change. Although it is claimed new biotechnologies offer a faster route to similar goals in terms of adapting traits and characteristics, classical breeding has in fact proved to be quicker and more efficient than biotechnologies when it comes to drought resistance and a comparison between the USA (cultivating GM crops) and the EU (where GM crops are rare) has shown no difference in yields between the two and a higher use of herbicide where the GM crops are used[2].

Classical breeding also provides - usually- non patentable seeds and products. This is a major advantage when it comes to the source of plant life (seeds) and of our food. Food security in the hands of big multinational companies, which, by definition, have a vested interest in profits, is an extremely scary scenario which we, as Greens, refuse to support.

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[1] Unexpected mutations after CRISPR–Cas9 editing in vivo, Shaeffer et al; 2017
https://www.nature.com/nmeth/journal/v14/n6/full/nmeth.4293.html

[2] Genetically Modified Herbicide-Tolerant Crops, Weeds, and Herbicides: Overview and Impact, 2016, Sylvie Bonny

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