

## RAGES - the topics

Working groups will be tackling a range of topics in the first half of 2017. The outcomes will be published after further discussions and reviews. We selected the following topics:

- [An overall, fit for purpose concept for EFSA risk assessment of genetically engineered \(GE\) plants](#)
- [Herbicide-resistant / -tolerant GE plants](#)
- [GE plants expressing insecticides](#)
- [Stacked GE plants and combinatorial effects](#)
- [GE plants with changed nutritional quality](#)
- [GE with enhanced fitness](#)
- [New methods of genetic engineering](#)

### An overall, fit for purpose concept for European Food Safety Authority (EFSA) risk assessment

According to a preliminary analysis of the experts, the current EFSA concept, known as the 'comparative approach', is not sufficient to identify and investigate the relevant differences between genetically engineered plants and their conventional counterparts. At present, the work that EFSA does is oversimplified and fails to place sufficient emphasis on uncertainties and limits of current knowledge. Low quality data submitted by industry and the lack of independent research are further general issues that negatively affect the processes and outcomes of risk assessment.



The working group is chaired by Angelika Hilbeck from ENSSER. Angelika Hilbeck has been actively involved in the risk assessment of genetically engineered plants for many years. She works at the ETH in Zurich and has published a large number of peer reviewed scientific papers. Read a publication by Angelika Hilbeck: <http://journal.frontiersin.org/article/10.3389/fenvs.2015.00071/full> [1]

### GE herbicide-resistant / -tolerant plants

Dozens of herbicide resistant plants have already been authorised for import into the EU ([http://www.testbiotech.org/en/gendatenbank\\_bilder](http://www.testbiotech.org/en/gendatenbank_bilder) [2]). These plants raise issues of specific environmental risks, not only during cultivation but also regarding imports. Food and feed derived from these plants contain specific patterns of residues from the herbicides they were made resistant to. However, the health impact of these residues has not been assessed in detail for import authorisation.



The working group is chaired by Nicolas Defarge from ENSSER. For several years, Nicolas Defarge has been investigating the toxicity of herbicide mixtures containing glyphosate that can be applied to genetically engineered plants. Read a publication by Nicolas Defarge:

<http://www.sciencedirect.com/science/article/pii/S027869151530034X> [3]

## GE plants expressing insecticides

Plants expressing insecticidal toxins are the second largest group of genetically engineered plants, after herbicide-resistant plants. At the beginning of 2017, around 30 such events had been registered in the EU for import, mostly maize and cotton ([www.testbiotech.org/en/gendatenbank\\_bilder](http://www.testbiotech.org/en/gendatenbank_bilder) [2]). Genetically engineered maize expressing Bt-toxin is also allowed for cultivation in the EU. It is grown in Spain on around 100.000 hectares. In near future, companies will be able to offer genetically engineered plants expressing small molecules (miRNA). Insects feeding on the plants will ingest the small molecules (miRNA) - this can interfere with their gene activity and ultimately kill them. There are many open questions in this area, especially in regard to environmental risk assessment.

The working group is chaired by Angelika Hilbeck from ENSSER (see above).

## Stacked plants and combinatorial effects

In an increasing number of gene-tech plants, herbicide resistance is being combined with insecticidal toxins. A well-known example is the Bt maize known as 'SmartStax', which produces six different insecticidal Bt toxins and is resistant to two herbicides. In these plants, the toxicity of residues from spraying might, for example, act synergistically with the insecticidal toxins. EU regulation requests that accumulated effects are assessed during risk assessment. This is, however, something that the EFSA so far has failed to do.



The working group is chaired by Christoph Then from Testbiotech. For several years, Christoph Then

has worked on regulatory science and standards applied in the risk assessment of genetically engineered plants. Read a publication by Christoph Then:

<http://enveurope.springeropen.com/articles/10.1186/s12302-016-0099-0> [4]

## GE plants with changed nutritional quality

There are already several genetically engineered plants that have been changed in their composition on the market. Most of these plants have had their oil composition changed, with the aim of enhancing their nutritional food/ or feed value. However, hardly any empirical investigations have been conducted in regard to their actual impact on health. EFSA never developed specific guidance for the risk assessment of these plants or the food and feed derived thereof.



The working group is chaired by Helen Wallace from GeneWatch UK. For several years, Helen Wallace has been actively involved in work on regulatory science and standards applied in the risk assessment of genetically engineered organisms, such as plants and insects. Read a publication by Helen Wallace: <http://www.world-agriculture.net/issue/8/World-Agriculture-Vol4-No1-Summer-2013> [5]

## GE plants with enhanced fitness

While conventional breeding has already successfully created many varieties with enhanced tolerance to environmental stressors, such as drought or humidity, " genetic engineering so far only brought one maize event onto the market that is claimed to show some tolerance to reduced water supply. At the same time, several publications have found that enhanced fitness in genetically engineered plants can emerge unintentionally, giving them an unexpected ability for persistence or invasiveness. So far, EFSA has not investigated any of these risks in detail.

The working group is chaired by Christoph Then from Testbiotech (see above).

## New methods of genetic engineering

New methods of genetic engineering, such as CRISPR Cas, are intended to enable more targeted but also more radical changes in the genome. Unintended side effects have been observed on several levels of the organisms. The marketing of plants and animals derived from these methods is imminent.



The working group is chaired by Janet Cotter from Logos Environmental. Janet Cotter works as a consultant providing scientific research to environmental organisations. Specialist research areas include GMOs, gene-editing techniques, pesticides in food and the environment and ecological agriculture. Previously, Janet Cotter was a senior scientist at Greenpeace International for 15 years (2000-2015). Read a publication by Janet Cotter:

<http://link.springer.com/article/10.1186/s40550-014-0005-8> [6]

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#### Links

[1] <http://journal.frontiersin.org/article/10.3389/fenvs.2015.00071/full> [2]

[https://www.testbiotech.org/en/gendatenbank\\_bilder](https://www.testbiotech.org/en/gendatenbank_bilder) [3]

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