

High iron doughnuts and yet more fishy business:

GM Freeze responds to plans for three new GM field trials

Three separate applications for open air GM field trials are making their way through the UK consent process as we write. GM Freeze is standing in opposition to all three and there is [still time to make your voice heard](#) on Rothamsted Research's latest attempt to grow GM camelina on their farms in Hertfordshire and Suffolk.

If allowed, this will be the fourth set of field trials that the Rothamsted team has planted with GM camelina. The project focuses on producing long-chain omega 3 "fish" oils for use in the fish farming industry, which many people regard as fundamentally unsustainable. We are also concerned that this proposed trial involves too many different elements, will not be properly contained and risks damage to wildlife. See page 3 for more on how to let the Department for the Environment, Food and Rural Affairs (Defra) know that you do not want this trial to go ahead.

The public consultation on two



Image: Coyau/Wikimedia Commons

planned field trials (one of GM wheat and one of GM brassica) at the John Innes Centre outside Norwich closed on 4 March. As with previous trial applications we submitted [detailed, fully referenced objections to each](#) on behalf of GM Freeze and 32 additional organisations including large NGOs, grassroots activist groups, farmers,

seed distributors and more. Many GM Freeze members and supporters also submitted their own objections and we are awaiting news from Defra on whether or not these two trials will be allowed to proceed.

The GM wheat has been modified to increase the amount of iron

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GM contamination in European fields

In the first week of February, [agritech giant Bayer admitted](#) that non-GM seed supplied to farmers in France and Germany had been contaminated with GM seed, leading to the destruction of around 11,000 hectares of rapeseed crops already planted.

The contamination is estimated at 0.005% or roughly one GM seed in every 20,000 supplied. Each rapeseed plant [can produce up to 3,000 seeds](#)

so a single GM plant growing to maturity in a farmer's field could cause significant harm. Bayer's reported offer of €2,000 per hectare compensation for affected farmers reflects this and the fact that those farmers will not only lose this year's crop but will also be prevented from growing rapeseed next season due to the risk of the GM

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Surprising sources highlight fundamental flaws in the process of genetic modification

DNA sequencing pioneer and Harvard professor George Church [surprised delegates at a recent medical conference](#) when he described CRISPR gene editing as a “blunt axe”, adding that “it’s called editing, I think it’s really genome vandalism”.

Church went on to make the case for a group of alternative genetic engineering techniques that move “beyond cutting [DNA]” but his arguments nonetheless back up much of what GM Freeze and civil society organisations around the world have been saying for years: that all forms of genetic engineering are significantly less accurate than those promoting them would have us believe.

Church raised two specific concerns with CRISPR tools – precision and repair. He challenged the popular metaphor that describes genome editing as using DNA “scissors”, highlighting the frequency with which “cuts” are made on different genes and even different chromosomes than those intended, as we described in [Thin Ice 41](#). He also raised concern about the fact that the much-hyped technique relies on a cell’s own DNA repair mechanism which can be defective, for example in cancer cells.

Meanwhile, lobbyists arguing that the European Union should regulate genome edited crops on the basis of the traits they are intended to produce, rather than the process used to create them, turned to [a Chinese research study published in July 2018](#) to back



up their position. The study did show that the actual editing part of the process led to fewer mutations than natural breeding but – and it is a very big “but” – this is only if you discount mutations caused by tissue culture and agrobacterium infection.

Tissue culture is the way in which cells are grown and multiplied outside of an organism, usually on a petri dish or in a test tube. It comes after the deliberate adding, removing or changing of an organism’s DNA, but it is an essential step in all forms of genetic modification of plants, including older techniques, CRISPR, and other forms of genome editing.

Agrobacterium infection is one of several ways in which modified DNA created through a variety of techniques (including CRISPR) is inserted into target plants. This process also came under fire in [a paper published in January by](#)

[researchers at the Salk Institute in the US](#). Describing *Agrobacterium tumefaciens* as “the workhorse in plant genome editing”, the paper identified large numbers of unintended gene insertions and rearrangements of DNA caused by the process, along with epigenetic (non-DNA) changes that could impact how genes operate in the plants.

The seductive lure of genome editing’s fabled precision was discussed in sessions at this year’s Oxford Real Farming Conference (ORFC), many of which can be accessed as slides, audio or video recordings at [www.orfc.org.uk/archive-2019](#). Key points made there include the importance of remembering that precision is not the same thing as accuracy – a stopped clock is very precise, but it is only accurate twice a day.

International agreement constrains, but does not prohibit, the use of gene drives

Late last year GM Freeze joined a group of 28 organisations to [urge the European Commission to support an international moratorium on gene drives](#) at the COP14 high level international meeting of parties to the Convention on Biological Diversity (CBD) ([Thin Ice 50](#)). The European delegation promoted something of a compromise and in the end the meeting [agreed a strong statement](#) that stops well short of a moratorium but is nonetheless a significant step in the right direction.

Gene Drives are a form of “super charged” GM technology that overrides natural laws of inheritance to ensure that a particular characteristic is passed on to all offspring. They have the potential to very quickly change the genetic make up of an entire population and to wipe out whole species.

The agreed CBD text calls upon governments “to apply a precautionary approach” and sets out three key requirements for the release of any gene-drive organisms into the

environment, including for research purposes. Quoting the text these are: (a) *Scientifically sound case-by-case risk assessments have been carried out* (b) *Risk management measures are in place to avoid or minimise potential adverse effects, as appropriate* (c) *Where appropriate, the ‘prior and informed consent’, the ‘free, prior and informed consent’ or ‘approval and involvement’ of potentially affected indigenous peoples or local communities is sought or obtained.*

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contained in the starchy endosperm which means that it will only make a significant difference in white flour. We argued that increasing levels of a single nutrient in foods like white sliced bread and doughnuts will not encourage or support people to eat a balanced, nutritious diet. We also highlighted the history of GM wheat escaping from field trials and the fact that the GM plants are resistant to two different antibiotics so could add to the growing problem of antibiotic resistant infections.

The GM brassica trial is part of a research study investigating the function of a particular gene. It should be carried out in a contained environment so we argued that, if the John Innes Centre doesn't have a suitable facility, they should invest in one rather than risking environmental harm and contamination by growing experimental plants in an open field. Brassicas are promiscuous plants known for their propensity to interbreed so contamination from the trial is a real worry for local farmers and garden or allotment growers of oil seed rape, cabbage, broccoli, Brussels sprouts or cauliflower.

The consultation period on the wheat and brassica trial applications fell between issues of *Thin Ice* so we relied on contacting people through our email list to share our guidance on the most effective way to object. Please ensure you are signed up to receive urgent action requests like these at www.gmfreeze.org/emails.

The work involved in opposing risky and unnecessary GM field trials arrives suddenly and on top of planned projects, but we know that our members and supporters really value GM Freeze taking the lead. Many of you have shown your support by donating to a special fund to cover the cost of responding quickly and effectively to field trials like these three. It costs us around £2,500 to respond to each trial, so if you haven't donated yet and would like to see us continue researching and crafting detailed responses; producing plain English guides to help others make their voice heard; and spreading the word through press and social media, please give what you can at www.gmfreeze.org/stop or by sending a cheque payable to GM Freeze to GM Freeze, Openspace Cooperative, 41 Old Birley Street, Hulme, Manchester, M15 5RF.

GM contamination ... continued from page 1

strain re-emerging from seed left in the ground.

The GM seed, which is of a type grown in Canada and authorised for import to the EU as food or feed but not for cultivation, was discovered by French authorities during routine checks in autumn 2018. It was found in three batches of seed produced in Argentina, in a supposedly GM-free area.

France and Germany are both among the seventeen European Union member states and four "competent authority regions" (including Scotland, Wales and Northern Ireland) that took up the opportunity introduced in 2015 to ban GM crops from cultivation in their territory (*Thin Ice 38*).

Biofortification

Biofortification means increasing the amount of a particular vitamin or mineral in a food plant. It is often achieved through conventional breeding but is also a focus for genetic modification projects, such as in the GM wheat under development at the John Innes Centre or the heavily promoted (but still not actually cultivated) golden rice.

In November 2018, the nutrition committee of the Codex Alimentarius Commission (a highly influential international body that establishes food standards and guidelines for use around the world) [considered the definition of biofortification](#). Delegates from countries such as Australia, Brazil, China and the United States (US) supported a definition that includes GM crops, while others opposed the move and many (including Chile, Russia and the European Union) rejected the proposed compromise that would allow different countries to decide whether or not to allow GMOs to be labelled as biofortified. No decision was reached and now the Codex Committee on Food Labelling will consider the question in May of this year.

TAKE ACTION

All applications for field trials of GM crops in the UK are subject to a statutory public consultation and it is really important that as many people as possible make their feelings known. To object to the planned new GM camelina trial at Rothamsted Research you should:

Email gm-regulation@defra.gov.uk with the application reference number 19/R08/01 in the email subject line

or

Write to the GM Team, Department for Environment, Food and Rural Affairs, Second Floor, Seacole Building, Marsham Street, London SW1P 4DF, stating the application reference number 19/R08/01

By Wednesday 27 March.

Please use your own words and focus on what matters to you, but here are some key points that you may want to make include:

- The application reads like a "pick and mix" of genetic modifications. The Rothamsted team has listed over a hundred different genetic elements and is asking for permission to mix them up as they see fit throughout the trial. Different genes interact with each other in often unexpected ways so no GM field trial should be considered until it is clear exactly how the plants involved have been changed.
- The omega 3 oils produced by these GM plants are not naturally produced by plants or animals living on land so they could affect the ecosystem in profound and unpredictable ways. These potential impacts need to be studied before the GM plants are grown in open fields.
- More needs to be done to ensure that seed or pollen with modified genes cannot escape from the trial.

INTERNATIONAL NEWS



Argentina

A gene-edited fish has been [granted exemption from GM regulation](#) by Argentina's National Advisory Commission on Agricultural Biotechnology.

Tilapia is a freshwater fish popular in commercial fish farming and aquaponics systems that combine fish and plant cultivation without soil. The gene-edited tilapia has been developed by biotech companies Intrexon and AquaBounty and is engineered to grow to market weight more quickly, and with less feed, than conventional varieties of the fish. Now that the Argentine authorities have decided that it should not be treated as a GMO, it will not be subjected to proper testing or regulation and will be more difficult to trace through the food supply.



Nigeria

In January, the National Biosafety Management Agency (NBMA) permitted the commercial cultivation of a GM cowpea engineered to be resistant to a pod-boring insect pest. The Health of

Mother Earth Foundation, together with a coalition of civil society organisations and farmers, [denounced the release of the Bt crop](#) which contains a transgene that has led to the development of pest resistance when included in other crops around the world. They also expressed concern that the GM beans are likely to contaminate indigenous varieties.

At a public rally in Abuja in December 2018, [coalition members had said](#) *"We reject agricultural biotechnology as a solution for food challenges and demand that Nigeria should instead invest in innovative systems such as agroecology which in addition to ensuring productivity, protect/enhance ecosystems and promote economic well-being of farmers."*



United States

The iconic monarch butterfly is in trouble again, with an annual census conducted by the non-profit Xerces Society for Invertebrate Conservation reporting an 86% decline in the number of monarchs arriving in California this winter, compared with the previous year. Combined with a 97% decline in the total population

since the 1980s, the count [was described by biologist Emma Pelton](#) as *"potentially catastrophic"* and *"a huge wake-up call"*. Peer-reviewed studies have repeatedly pinned the blame for monarch decline on the use of glyphosate, particularly on glyphosate-tolerant GM crops.

Some potential good news from the states comes with [a poll showing a decline in public acceptance of GMOs](#). The Pew Research Centre questioned Americans in 2016 and again in 2018. When asked to state whether GM foods were better or worse for one's health in 2016, 39% said that GM foods are worse. In the 2018 study that figure had risen to 49% which a further 44% saying neither and only 5% stating that GM foods are better. Writing on a news website for US agricultural producers, journalist [John Phipps suggested](#) that GM proponents may be making things worse, asking *"Is it unthinkable to just disengage from this debate?"*. The idea that the public might actually know what they are talking about wasn't, however, discussed in his article.

Innovation principle

In December 2018, the European Parliament voted on issues connected to its Horizon Europe funding programme and, in doing so, passed for the first time a text that included mention of the so-called "innovation principle".

The innovation principle was developed in 2013 by the European Risk Forum (ERF), which is funded by Bayer, Dow Chemical, EuropaBio,

Syngenta and BASF, amongst others. It is a direct challenge to the powerful precautionary principle and, according to ERF, [aims to](#) *"stimulate confidence, investment and innovation"* based on the assertion that *"innovation is the single most important driver of growth in a mature economy"*.

Innovation does not, of course, equate to technology – converting a high-input factory farm to an

organic oasis is an innovation for that business – but one look at the ERF funders list shows the intention here. As [Nina Holland from Corporate Europe Observatory commented](#), *"The 'innovation principle' is a trap, a disguised lobby tool invented by the chemical, tobacco and fossil fuel industries to attack those EU safety rules meant to protect people and planet from harmful products."*

GM Freeze is working to help create a world in which our food is produced responsibly, fairly and sustainably. We consider and raise the profile of concerns about the impact of genetic modification. We inform, inspire, represent and support those who share our concerns. We campaign for a moratorium on GM food and farming in the UK. We oppose the patenting of genetic resources.



A referenced version of this newsletter is available online – www.gmfreeze.org/thinice

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We use an 0845 phone number to protect the privacy of our staff, who work from home. Calls to this number will cost 3p per minute plus your telephone company's Access Charge.



www.gmfreeze.org