

Written Evidence submitted by GM Freeze (GMC0020)

GM Freeze is a non-profit campaign group supported by a wide alliance of organisations and individuals sharing the public's deep concern about the speed at which genetic modification is being introduced into food and farming. We do not object to the technology itself, but are concerned about the impacts its current incarnations have on people and our natural environment. We are submitting evidence to this inquiry because we believe that the precautionary principle is a vital safeguard for the natural environment and human and animal health.

1. EXECUTIVE SUMMARY

- 1.1. Major adverse environmental impacts are associated with the cultivation of herbicide-tolerant "Roundup Ready" GM crops in the USA and elsewhere. These crops are in the EU authorisation pipeline and may be the first commercial GM crops to be planted in the UK if commercial cultivation proceeds.
- 1.2. The UK has an opportunity to lead the way in modern sustainable farming without the use of GM, but the current focus on GM draws funding away from these areas of development.
- 1.3. Commercial cultivation of GM crops in England would require legislation on coexistence and liability to protect conventional and organic crops from contamination, maintain consumer choice and facilitate withdrawals of products if anything goes wrong. Segregation and monitoring throughout the food chain would add to food supply costs, reducing competitiveness.
- 1.4. There are significant barriers to independent research into the efficacy and safety of GM food and crops.
- 1.5. The EU's application of the precautionary principle in relation to GM food and crops is entirely appropriate because a number of negative effects have been identified, including both the documented environmental impact of planting Roundup Ready crops, and other effects for which it is not currently possible to evaluate either the likelihood or impact to an acceptable level of certainty. It is entirely appropriate to ask those wishing to develop GM food and crops to prove that they are safe.
- 1.6. History is littered with examples of environmental and health disasters that would have been averted had the precautionary principle been applied when concerns were first raised.

2. ARE CURRENT EU AND UK REGULATIONS INTENDED TO ASSESS THE SAFETY OF GENETICALLY MODIFIED (GM) FOODS FIT FOR PURPOSE? IF NOT, WHY NOT?

- 2.1. Current EU and UK regulations are essential to protect human health and the environment. Weakening GM regulations is unlikely to increase consumer confidence or provide adequate protection for human health, the environment or affected businesses.
- 2.2. Beyond the safety of individual genes or traits, it is critical that regulations protect the environment and affected businesses, reflecting the wider impacts of planting GM crops. Major adverse environmental effects are unfolding where GM herbicide-tolerant crops are currently cultivated, including a significant decline in Monarch butterflies due to blanket spraying.¹ Negative effects on wildlife habitats are consistent with the findings of the UK Farm Scale Evaluations (FSEs), a four-year programme of research conducted and published in 2003.² The recommendations of the

¹ Pleasants JM, Oberhauser KS, 2013. "Milkweed Loss in Agricultural Fields because of Herbicide Use: Effect on the monarch butterfly population". *Insect Conservation and Diversity* 6(2):135–144

² Defra, 14 May 2007. "The Farm Scale Evaluations". See <http://webarchive.nationalarchives.gov.uk/20080306073937/http://www.defra.gov.uk/environment/gm/fse/>

December 2008 Environment Council meeting must be implemented to ensure the negative environmental impacts associated with growing herbicide-tolerant GM crops (such as Roundup Ready crops) are properly considered during the risk assessment process, particularly as our understanding of the science is developing and expanding.³ Roundup Ready crops (eg Monsanto's NK603 maize and Syngenta's GA21 maize) are in the EU authorisation pipeline and may be the first to be planted if commercial cultivation proceeds in England (since the UK does not have suitable growing conditions for the pest-resistant Bt maize MON810 currently grown in other parts of the EU). The negative environmental effects of blanket spraying Roundup include the loss of wildlife habitats and the growth of resistant superweeds. Health concerns include the impacts of increased pesticide residues in the food chain.

3. HOW HAVE EU AND UK REGULATIONS ON GM FOODS AFFECTED THE UK'S INTERNATIONAL COMPETITIVENESS?

3.1. We encourage the Committee to consider the significant number of markets that exclude or discourage GM foods and crops, the commercial advantage of being able to identify and label GM-free crops, the rapidly increasing costs of controlling superweeds and superpests in the major GM-growing countries and the fact that there are unlikely ever to be end-product markets that specifically demand GM goods. Research suggests that non-GM farming in the EU has outperformed GM farming in the USA and that Europe has maintained a greater diversity of seeds by avoiding GM cultivation.⁴

3.2. Enforceable coexistence laws are essential to protect consumer choice and allow recalls of products if anything goes wrong. Indeed, government policy states, "If and when GM crops are grown in England commercially, we will implement pragmatic and proportionate measures to segregate these from conventional and organic crops, so that choice can be exercised and economic interests appropriately protected."⁵ Segregation of GM and non-GM crops adds to costs at every stage of the food chain. Introducing GM crops to any part of the UK would, therefore, increase food production costs and reduce competitiveness.

3.3. Looking at agricultural, technological and scientific competitiveness more widely there is an opportunity for the UK to become a leader in a wide range of modern, sustainable farming methods that do not carry the price tag, risks or time lag associated with GM. Examples such as Rothamsted Research's collaboration with the International Centre of Insect Physiology (ICIPE) on the development of the "push-pull" system to control corn-borer and striga lead the way, but the current focus on GM risks depriving similar developments of investment.⁶

4. DOES THE CURRENT EU AND UK REGULATORY FRAMEWORK ALLOW FOR GM FOODS TO EFFECTIVELY CONTRIBUTE TO THE DELIVERY OF THE UK AGRICULTURAL TECHNOLOGIES STRATEGY? IF NOT, WHY NOT?

4.1. Robust regulation allows the Government to fulfil its duty of care to protect the environment and human and animal health. This need not work against innovation. Indeed it is only by protecting assets such as the health and diversity of our seed stock, the effectiveness of pest controls, and the

3 Council of the European Union, 4 December 2008. "Council Conclusions on Genetically Modified Organisms". 2912 Council Meeting

4 Heinemann JA, Massaro M, Coray DS, Agapito-Tenfen SZ, Wen JD, 2013. "Sustainability and Innovation in Staple Crop Production in the US Midwest". *International Journal of Agricultural Sustainability* 1–18

5 Defra, updated 20 December 2013. "Policy: Making the food and farming industry more competitive while protecting the environment – Supporting Detail: Genetic modification"

6 Rothamsted Research, 10 May 2005. "How companion planting is helping over 3000 African farmers". See www.rothamsted.ac.uk/news/how-companion-planting-helping-over-3000-african-farmers

health of our agricultural soils that we can truly secure the potential for agriculture to contribute to economic growth on a long term basis.

4.2. Beyond regulation, there is a significant danger that the current focus on GM will work against the Government's desire to "exploit opportunities to develop and adopt new and existing technologies, products and services to increase productivity".⁷ Conventional breeding programmes, conservation of agricultural biodiversity, work to rebuild degraded soils, extension services working to spread best practice and other areas of agricultural development are currently under-resourced and unable to contribute their full potential to the UK economy.

5. WHAT ARE THE PARTICULAR BARRIERS TO THE CONDUCT OF RESEARCH ON GM FOODS IN THE UK?

5.1. The application of patents and other forms of control over genetic resources in GM developments and end products blocks independent research into both emerging and existing GM developments. Research into the efficacy and safety of GM products for animals, human health and our natural environment is generally either conducted or commissioned by patent holders who retain control over which studies are published and which shelved. The public can have little faith that what data is made available accurately reflects the balance of evidence or gives a true representation of the risks. Furthermore funding is heavily directed towards the development of specific commercial applications to the detriment of broader research into the effects of consuming GM foods (such as long-term feeding trials); the consequences of the processes involved in genetic engineering; or the improvement of our understanding of gene regulation, gene interaction and hidden regulatory sequences across the genome.

5.2. There is a perception that the precautionary principle allows individuals and groups who are "anti-science" to simply "cry wolf" and halt progress, but that is not true. As described by the World Commission on the Ethics of Scientific Knowledge and Technology, "Some form of scientific analysis is mandatory; a mere fantasy or crude speculation is not enough to trigger the precautionary principle. Grounds for concern that can trigger the PP are limited to those concerns that are plausible or scientifically tenable (that is, not easily refuted)."⁸

5.3. Looking more broadly at the issue of research, the persistent equating of "science" and "technology" with GM means that other areas of research and development are neglected. There is a danger than GM will, by default, become the **only** "tool in the box" if investment is not made in a broader palette of potentially beneficial scientific approaches to sustainable agriculture.

6. IS THE EU'S APPLICATION OF THE PRECAUTIONARY PRINCIPLE IN RELATION TO GM FOODS APPROPRIATE? DOES THE EU RECOGNISE AND HANDLE PROPERLY THE CONCEPTS OF HAZARD AND RISK?

6.1. The precautionary principle is a scientific principle, established within this context for a considerable time and integral to both the international Cartagena Protocol on Biosafety (under the Convention of Biological Diversity) and the Lisbon Treaty. The application of the precautionary principle serves to protect through the prevention of avoidable harm in strictly set scenarios. The consequences of not upholding it can be seen in the suffering and harm caused by thalidomide, asbestos, organophosphates and many other historic cases where early warnings were ignored in favour of financial and/or political interests.⁹

⁷ Defra/DFID Policy Paper, updated 24 December 2013. UK Strategy for the Agricultural Technologies: Executive summary

⁸ World Commission on the Ethics of Scientific Knowledge and Technology, March 2005. The Precautionary Principle

⁹ European Environment Agency, 2 January 2002. Late Lessons from Early Warnings: The precautionary principle 1896-2000. Environmental issue report No 22/2001.

See www.eea.europa.eu/publications/environmental_issue_report_2001_22 and European Environment Agency, 23 January 2013. Late Lessons from Early Warnings: Science, precaution, innovation. EEA report 1/2013. See www.eea.europa.eu/publications/late-lessons-2

- 6.2. The application of the precautionary principle in relation to GM foods is entirely appropriate because the process of genetic modification meets the criteria described in both the Lisbon Treaty (environmental policy “shall be based on the precautionary principle” and “shall take account of available scientific and technical data”¹⁰) and the European Commission communication on the subject in 2000 (“Recourse to the precautionary principle presupposes that potentially dangerous effects deriving from a phenomenon, product or process have been identified, and that scientific evaluation does not allow the risk to be determined with sufficient certainty.”¹¹)
- 6.3. A number of potentially dangerous effects from the actual process of genetic modification have been identified. The physical insertion of genes into the genome (using gene guns or *Agrobacterium*) and the use of chemical cocktails within the tissue culture steps both have the potential to (and often do) produce significant unintended and unexpected effects through: a) transformation induced mutations (which can lead to disruptions or sequence alterations of genes); b) the disruption of plant genes; c) novel interactions; d) up- or down-regulating of the plant’s own genes or e) the activation of sequences previously not utilised by the plant.¹² Beyond these currently identified impacts, new effects come to light regularly. Our understanding of genetics is still very limited, as demonstrated by the emerging field of epigenetics, and such limits to human knowledge are the very foundation of the precautionary principle, which exists to protect society and the environment against new hazards with the potential to expose us to unquantified risks.
- 6.4. Further potentially dangerous effects of growing genetically modified crops have also been identified. Outcrossing to wild relatives, land races or cultivars carries a risk of irretrievable genetic pollution, often with unknown consequences. Once a GM crop is planted, its pollen and seed will spread wherever the wind, wildlife or human error take it, such as with experimental GM bentgrass designed for golf courses and now spreading uncontrollably along watercourses in Oregon, USA.¹³ Once a transgene enters the wild genome it potentially becomes a permanent part of our environment, with effects that cannot be predicted. The consequences of a damaging trait entering our environment are potentially devastating because there is no way to recall, contain or neutralise either its direct effects or the impact it may have on the wider ecosystem. This is a clear case for precaution.
- 6.5. The scale of potential damage caused by GM (the hazard) is systemic and cannot currently be determined with sufficient certainty to evaluate risk through a standard probability and impact-based model. It is, therefore, appropriate to apply the precautionary principle, to require those wishing to develop GM foods to prove that their products will not cause significant harm and to also require them to accept full environmental and economic liability for any harm their products do cause. The likelihood of a particular outcome occurring does not have to be high for the resulting risk to be unacceptable if the impact it could have is potentially devastating and irreversible.

7. ARE THERE OTHER EXAMPLES OF EU REGULATION IN WHICH THE PRECAUTIONARY PRINCIPLE HAS NOT BEEN APPLIED APPROPRIATELY?

- 7.1. We believe that the precautionary principle is being applied appropriately in the case of GM. However the history of farming around the world includes many examples where the application of

¹⁰ Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union and the Charter of Fundamental Rights of the European Union. Article 191

¹¹ European Commission, 2 February 2002. “Communication from the Commission on the precautionary principle”. Ref; COM(2000) 1

¹² Prescott VE, et al, November 2005. “Transgenic expression of bean alpha-amylase inhibitor in peas results in altered structure and immunogenicity”. *Journal of Agricultural and Food Chemistry* 53:9023-30 and Wilson A, Latham J and Steinbrecher R, December 2006. “Transformation-induced Mutations in Transgenic Plants: Analysis and biosafety implications”. *Biotechnology and Genetic Engineering Reviews*, Vol 23, pp. 209-237

¹³ Snow AA, October 2012. “Illegal Gene Flow from Transgenic Creeping Bentgrass: The saga continues”. *Molecular Ecology* Vol 21, issue 19, pp 4663-4664

the precautionary principle could have averted disaster, from the introduction of cane toads in Australia to DDT in the USA, where a key factor in increasing the pesticide's potential to cause harm (its persistence in the environment) was actually presented as selling point.

- 7.2. Looking specifically to the EU, the 1969 Swann report identified potentially dangerous effects of using antimicrobials as growth promoters. The Committee's recommendations to restrict use were based on a low level of scientific proof and were, therefore, precautionary. These recommendations were rejected by the EU in 1975, and we now have substantial scientific evidence that the consequent use of antimicrobial growth promoters in food animals contributes to the problems of antimicrobial resistance in humans. The precautionary principle was not applied in this case. It would have been appropriate to do so and would have helped prevent the current difficulties we face with both human and veterinary antibiotic resistance.
- 7.3. A similar, but much longer, history is attached to the use of tobacco. London physician John Hill reported cases in which snuff caused nasal cancer in 1791 and the first strong connection was made between lung cancer and smoking in 1912, long before the establishment of the European Economic Community (EEC) in 1957 and 90 years before any kind of effective ban on tobacco advertising and sponsorship was adopted in the EU.¹⁴ A prompt application of the precautionary principle on the establishment of the EEC would have saved millions of lives across Europe.
- 7.4. Organophosphates cause a wide range of symptoms including vomiting, breathlessness, dizziness, blurred vision, convulsions and coma. They are also endocrine disruptors and have been linked to neurological disorders such as Parkinson's disease.¹⁵ Their acute toxicity is now well-recognised, but it took far longer for the impacts of low-level, long-term exposure to be acknowledged. It was recommended as early as 1951 in the UK that organophosphates should be labelled as deadly poison, but containers were only labelled in 1976 and no directions or cautions about safe use were included. Later, during the 1980s and 1990s, many farm workers reported symptoms ranging from memory loss and depression to fatigue, joint and muscle pain and generalised weakness. They attributed this to low-level exposure to organophosphates over many years, especially through (mandatory) sheep dips. Finally, in 2012, a paper was published showing that organophosphates definitely do affect cognitive function, most obviously memory.¹⁶ A proper use of precaution could have prevented many of these impacts.
- 7.5. These are only a few examples and research by the European Environment Agency indicates a clear tendency to act either too late or not at all in response to early warnings.^{ix} It would be of interest to investigate whether the history of regulation and adherence to the precautionary principle is strewn with "false negatives", though it must also be remembered that these may be reversed where the impact of ignoring unquantifiable hazards is more often permanent.

¹⁴ Action on Smoking and Health, undated. "Key dates in the history of anti-tobacco campaigning". See www.ash.org.uk/files/documents/ASH_741.pdf

¹⁵ Pesticide Action Network North America, undated. "Organophosphates". See www.panna.org/resources/organophosphates

¹⁶ politics.co.uk, undated. "Organophosphates". See www.politics.co.uk/reference/organophosphates and Farmers Weekly, 3 December 2012. "Exposure to organophosphates harm memory, say scientists"

8. DECLARATION OF INTERESTS

GM Freeze, its staff and Directors have no commercial interests in the research or application of GM technology. We would be happy to share with the Committee a list of member organisations, details of our funding or other relevant issues and request guidance on what the Committee considers to be a material interest for this inquiry.

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