

Genetically Modified Crops and Human Health

Government Presentation at Westminster Central Hall, 6th March 2007 – Report by Lara Walter, Researcher and BSc Nutritional Therapy Student.

Attended by many professionals acting in science, environmental and public health, the objective of the event was to speak out against the UK government's aim to allow 0.9% genetically modified (GM) contamination of UK crops.

The Issue: DEFRA's GM Co-Existence Regime

The European Commission's (EC) EU directive 2001/18/EC from March 2001 called for member states to take appropriate national measures on GM co-existence in order to avoid unintended presence of GMOs in other products. Co-existence of GM plants next to conventional plants needs to be regulated. The EC provided a general framework to all EU member states to build their own GM co-existence regimes. The EU member states are required to provide the EC with the necessary regime details. The EC's aims are to balance the interests of all farmers, determining this on a 'crop-by-crop' basis. Any GM crops already approved for cultivation were assumed 'safe' to human health and the environment.

On 19th July 2006, the governmental Department for Environment, Food and Rural Affairs (DEFRA) published its recommendations for a "Coexistence Regime" between GM, conventional and organic crops in the UK. This document only covers four main crops (oil seed rape, potatoes, sugar beet, and maize). The main recommendations are based on a 0.9% contamination "threshold", whereby it should be statutory to adhere to specific separation distances between crops. It requires that only "commercial" farmers within those proposed separation distances need to be informed. Liability and compensation are only suggested to be carried by farmers for "direct losses", ignoring any damages created beyond the 'farm gate'. After nearly 3 years since the initial commercial GM crop introduction in the UK, it is suggested that the regime would only be reviewed on a crop-by-crop basis and in the case of any new crops appearing in the market.

The event highlighted that DEFRA's Co-Existence Regime will encourage further GM pollution, since contamination risks beyond the farm gate are ignored. It lacks the precautionary approach, insisting that aiming for zero contamination is unrealistic. This means that accidental contamination is unavoidable, through negligent separation distances or accidental contamination during any stage of the seed production and storage. Allowing accidental GM contamination will more likely reach levels of above 0.9% contamination, making the term 'threshold' insignificant.

The Event

The main subject of the presentations was the effects and implications of GM crops and foods on human health. Supported by scientific research studies, evidence of environmental and health hazards in humans and animals were shown. It was criticised that DEFRA's regime is too lax and encourages cross-contamination. It was demanded that the government should instead aim for the lowest possible detectable zero levels, instead of an unrealistic threshold

of 0.9%. It was demanded that a general culture change and more independent, peer-reviewed research are essential, before allowing any kind of contamination.

Organized by The Green Network Charitable Trust (www.environmentalhealthfocus.co.uk), the event hall was filled with many attendees from diverse backgrounds and was filmed by Ray Dawkins for the independent channel FrontierTV.

It is intended that all speakers will appear again in front of the European Commission in Brussels in May 2007 to present their views and findings, highlighted at this Westminster Central Hall event, to speak out against DEFRA's 0.9% co-existence regime.

What Does GM Mean?

Genetic modification (GM) or genetically modified organisms (GMO) describes the utilization of genetic engineering mostly within certain plants or other food types. Genetic engineering takes specific genes and sections of the DNA from one organism or species which will be transferred (inserted) into the DNA of another species. This transfer process is generally enabled via viruses.

One of the aims of this procedure is to make these organisms more resistant to otherwise detrimental environmental influences (i.e. herbicides). Alternatively, they can be given specific genetic characteristics that, when correctly expressed, can be exploited to alleviate or even treat certain diseases. Most of the new GM products have been introduced by big biotech and pharmaceutical companies, who are aggressively pushing the developments in this area and who claim that these processes are very controllable and precise.

A lot of research has already been presented over the past decades, showing that GM is far from precise, very unstable and could pose serious risks to public health and the environment. So far commercial confidentiality has been used by the biotech companies as an excuse to withhold important information about test studies of their GM products to the public.

Event Speakers and Speeches



Margaret Alison of Mar, the 30th Countess of Mar, opened and supported the event throughout the day. Margaret, Countess of Mar is an independent cross-bench member of the House of Lords, meaning she is not aligned with any particular political party. As an elected hereditary peer and the holder of the original Earldom of Mar, the oldest peerage title in the United Kingdom, the Countess of Mar is the only *suo jure* Countess in the House of Lords. The Countess of Mar is a supporter of public interests in various environmental and public health issues, representing a strong voice in the House of Lords. Countess of Mar is also one of the patrons of the Green Network Charitable Trust (www.environmentalhealthfocus.co.uk), the organiser of this event.

Dr Margi Lennartsson, research director of HDRA Organic Gardeners was the first speaker of the event. Dr Lennartsson represents HDRA (Henry Doubleday Research Association), also called "Garden Organic" (www.gardenorganic.org.uk) the national charity for the organically certified growing for food, farming and gardening. The association supports organic gardening for domestic horticulture, on the community level (i.e. allotments, schools), management of state gardens (i.e. golf courses, schools), and commercial agricultural land management systems (farming). The organisation also advises UK and international departments on sustainable organic gardening.

With over 32,000 members, HDRA is 100 percent committed to producing organically, according to the Soil Association's standards. HDRA rejects any kind of GM crop existence in the UK, due to cross-pollination risks and various possible health risks associated with GMOs. The association utilises a precautionary approach, because of the existing uncertainty about the impact on the environment and public health. HDRA strives to protect their heritage seed library, since common seed varieties are best adapted to specific local conditions.

The introduction of GM seeds would inevitably cause consumer dependence on corporate organisations manifesting their control, since these seeds have to be newly bought each year. This will bring further loss of biodiversity. Therefore a 0.9% contamination threshold is not acceptable. The HDRA rejects any GM in certified agricultural systems, insisting that organic growers at all levels have the right to keep their seeds, plants and horticultural and agricultural systems free of GMO.



Dr Gundula Azeez, policy manager at the Soil Association (www.soilassociation.org), represented the UK's leading campaigning and certification organisation for organic food and farming. The Soil Association was founded in 1946 and is the main certifier of organic foods. The Association estimates that organic products currently generate around £1.7 billion a year. Dr Azeez spoke out very strongly against DEFRA's Co-Existence Regime, since the risks of cross-pollination and contamination of GM crops will not only threaten organic crops but will pose serious environmental and human health hazards.

Many supermarkets started to adopt non-GM policies, but not all. The association strongly believes in the precautionary principle, striving for foods that are safe and sustainable. Manipulating and altering foods, "the very basis of life" is unethical; instead they should be left in their natural form. With GM technology, biotech companies have claimed to be able to stop most diseases, feed the world, and in general deliver human health and even sustainability of the 'planet'. Eleven years down the line, none of this has happened. According to Dr Azeez, organic foods seemed to have achieved more than that, i.e. foods with higher nutritional levels, and naturally drought resistant foods, when compared with conventional crops.

The effects, long-term impact, direct and indirect risks to human health and environment are very complex but are still poorly understood. Various research studies have shown that the consumption of GM foods can cause considerable health risks. Effects on public health and the environment through GM contamination will inevitably jeopardize consumer trust in organic foods. Further risks include the loss of biodiversity over local seed varieties, restricted access to clean seeds, and the inability to grow certain crops. Dr Azeez also suggested a possible loss of whole markets, inducing eventual product recalls, which in turn would increase testing programme-induced costs as well as possible liability and compensation costs.

GM contamination is one of consumers' top concerns, and is therefore one of the Association's top priorities. The Soil Association is opposed to any type of GM contamination of foods. The SA believes that the 0.9% contamination 'threshold' and other recommendations in the DEFRA proposed Co-Existence Regime is unclear and carries lax guidelines. DEFRA ignores any economic impacts of contamination below the 0.9% threshold. The 'threshold' recommendation should be used for labelling purposes. The Soil Association demands a 0.1% limit of GM contamination, not 0.9%. Furthermore, all costs for legal liabilities or compensation arising from GM contamination should be solely carried by the GM industry, i.e. biotech companies, who are initiating and creating the GM pollution.

Professor Malcolm Hooper (Chief Scientific Advisor to British veterans with Gulf War Syndrome, a biochemist and Emeritus Professor of Medicinal Chemistry at the School of Health, Natural & Social Sciences, University of Sunderland) predominantly discussed the implications of agrochemicals on human health, particularly the effects of herbicides.

Organophosphates (OPs) are used in conventional farming and can be found as part of insecticides, herbicides, and nerve gases. In less-toxic compounds they can be used as solvents, plasticisers, and EP additives. Chemically related to nerve agents, they are often also used in pesticides. Residues stay in the plant that is available for consumption. Genetic engineering can incorporate these toxins into plant genomes (i.e. through *Bacillus thuringiensis*, called Bt). These toxins can then be found in every plant tissue cell producing a “living pesticide”. Most GM crop traits will include herbicide tolerance and insect resistance through the use of Bt genes. Bt has already been introduced into plants like maize, oil seed rape (Canola), potato, cotton, rice, wheat, soy.

Testing has so far been concerned with bacterially-derived toxins; not with natural or plant toxins. No studies have yet assessed the level of toxicity of the actual toxins produced by the gene inserts of those GM plants. Since GM soy products were first introduced to the UK in 1996, soy allergies, Prof Hooper mentioned, increased by over 50 percent.

The use of GMOs will inevitably bring an increase in the use of those chemicals, which will have serious health implications on human health, environment and wildlife. Herbicides are designed to kill **all** plants, unless a herbicide-tolerant gene is present and functional, as in herbicide-resistant GM plants.

Most commonly used herbicides are **glyphosates**, first sold by Monsanto Company under the trade name Roundup™. Monsanto is a multinational agricultural biotech company and leading producer of GM seeds (i.e. exclusively producing “Roundup Ready” GM soybean seed for the commercial market).

Glyphosates attack vital enzyme pathways in humans and animals, negatively affecting ganglioside synthesis (nerve cell production), glycolysis and gluconeogenesis, among other things. These are known to produce sub-chronic and chronic adverse effects, including carcinogenicity, mutagenicity and reproductive disorders. These types of agent will seriously affect the lungs (i.e. when inhaled), but will also affect the skin, immune system, and nervous system (e.g. Parkinson’s disease, also in combination with other fungicides, insecticides and other pesticides), produce endocrine disorders (e.g. adrenal deficits), and depression of liver detoxification. As little as 100ml of glyphosate can cause acute toxicity. Surfactants used to spread glyphosates around the fields create an even more toxic compound. Producing herbicide-resistant seeds will encourage crop producers to increase their usage of higher levels of agrochemicals such as herbicides and pesticides.

Accepting a “0.9%-contamination-threshold” will encourage the introduction of GM plants, inevitably increasing the risk of a much wider, uncontrollable cross-pollination which will be hard to monitor or prevent. Alone from the aspect of agrochemical usage, the introduction of GM plants will therefore bring a multitude of health risks and environmental concerns.



Dr Mae Wan Ho, geneticist and founder of the Independent Science in Society (www.i-sis.org.uk) spoke next. After publication of some of her various test results in her GM research, Dr Ho, like many other scientists in the field, had her funding cut and was discouraged from proceeding with her work. Dr Ho had to leave her institution and laboratories, where she had worked for nearly 25 years, which encouraged her to found the Independent Science in Society.

During her presentation Dr Ho highlighted various test results of GM foods and feeds in animals and plants from multiple scientific studies, including photographic evidence of their adverse effects. Many varieties of GM crops (soybeans, tomatoes, maize, cotton, potatoes, and peas) with different transgenes, fed to rats, mice, cows, sheep, chickens or human beings, resulted in illnesses and deaths. Disease hazards and developed illnesses have also showed up in some farmers. GM processes and the artificial genetic material used are obvious suspects. Many more research studies in the last few decades have shown potential health hazards of GM foods on plants and the environment. GM crops have failed to deliver the promises made by the biotech companies manufacturing these products; and some insects and other pests have developed resistance to GM plants meant to deter them. Those ‘Superweeds’ are promoting new allergies.

Natural DNA is naturally made in living organisms, while GM DNA is manufactured in the laboratory. GM DNA contains bits of copied DNA of a wide variety of organisms synthesized in the laboratory. Natural DNA has billions of years of evolution behind it. GM DNA contains genetic material and combinations of genetic material that have never existed. GM DNA is designed to cross species barriers and to jump genomes. This would include genetic code changes enhancing gene recombination (breaking into genomes and rejoining). GM DNA often contains antibiotic resistance marker genes that are needed in the creation of GMOs.

The main problem with GM is that transgenic DNA is far from stable, contrary to biotech companies and regulators claims. Furthermore, horizontal gene transfer is a major issue, allowing e.g. viruses or other micro-organisms to be activated, passing on genes to other organisms (e.g. via pollen). This can also happen after cells die, since the DNA will remain intact.

Horizontal gene transfer allows foreign genetic material to jump into other genomes, creating new combinations (recombination) of genes or new genomes. This generates new viruses and bacteria that can cause new diseases, as well as antibiotic and drug resistance spread into other disease agents. This will make infections more difficult to treat. GM inserts are more likely to undergo this horizontal transfer and recombination than natural DNA, therefore making them structurally unstable. Multiple scientific study-based evidence showed that all GM inserts fragment and rearrange. Disease-causing viruses and further genetic modification are facilitated and catalysed by this horizontal gene transfer.

Transgenic lines (GM DNA inserts or specific fragments of them) have to be characterised very carefully to make sure they are stable. However, when testing some of them, results showed that for at least five successive generations, a single transgenic line that was initially taken from the genetic insert could quickly jump around and rearrange itself, to form completely new transgenic lines (called ‘jumping genes’). Characterisation of specific transgenic lines is currently a requirement by the EU directive. This can be used as a method for detecting transgenic contamination of GM produce and should be used for monitoring purposes.

GM DNA (as well as natural DNA) does not break down sufficiently during food processing as well as during food digestion in the GIT (gastro-intestinal tract). GM DNA can then be taken up by bacteria and other micro-organisms; studies confirm this, having detected transgenes in gut bacteria and lymphocytes. Thus GM inserts can pass into the bloodstream and be transported to other tissue cells, where these inserts can be readily integrated into the DNA. GM inserts can also transfer to bacteria during food processing and storage.

New generations of GM food, “GM Health Food Crops”, have created a lot of recent hype. These are crops partly created to overproduce e.g. a specific single micronutrient. This

ignores the importance of a balanced diet and, apart from the GM health hazards mentioned, could be detrimental to health because of the possible excess consumption of that specific nutrient. Other 'GM health foods' are GM probiotic bacteria. These will give the potential for creating pathogens pre-adapted to thrive in the human and animal gut and may prevent existing micro-organisms, vital to health, from colonising.

Dr Ho: Summary of Main Potential Hazards of GM Foods

- Synthetic genes and gene products new to evolution could be toxic and immunogenic for humans and other animals
- GM represents greatly enhanced and facilitated horizontal gene transfer and recombination, the main route to creating pathogens responsible for major diseases
- GM DNA consists of antibiotic resistance marker genes as well as copies of genes from many viral and bacterial pathogens, which will further increase the likelihood of horizontal gene transfer and recombination, creating new pathogens and the spread of antibiotic resistance
- Creation of GMOs is an uncontrollable, imprecise process that can generate unintended toxic and immunogenic products, exacerbated by the instability of transgenic varieties.
- GM DNA in GMOs released into the environment can be readily transferred to other species via pollen, or by direct uptake into cells of all organisms interacting with the GMOs, within the GMOs themselves, in the soil, water and gut of animals feeding on GMOs, providing plenty of opportunity for horizontal gene transfer.
- GM DNA is designed to integrate into genomes; unintended integration of GM DNA into the genome of cells of animals (including humans) could result in harmful insertion genetic mutations (including those that trigger cancer)
- Herbicide-tolerant GM crops accumulate herbicides and herbicide residues that could be highly toxic.

Problems with the Regulators

- No previous GM labelling existed in countries like the US where GM food and feed are most available
- Many GM products are 'de-regulated' by US regulators and are therefore not traceable
- There has been no post-release monitoring, which makes it impossible to tell how many people and animals have become ill or have died from eating GM food and feed

US regulators continue to insist that "GM food is perfectly safe", 'because people have been eating GM food since its first release in 1994 and no one has fallen ill or died from it'. However, the above points show that this statement is invalid, since no appropriate regulatory and post-monitoring actions have been undertaken. In the mean time, Dr Ho highlighted, food-borne illnesses were up by nearly 10-fold only 5 years after GM food had been commercialised.

According to Dr Ho:

,"regulators have ignored the precautionary principle, manipulated and corrupted science, sidestepped the law, and helped to promote GMOs in the face of massive public opposition and damning evidence piled up against the safety of GM food and feed. If evidential scientific research would have been taken serious by applying the precautionary principle, GM crops should have been halted from development and commercialisation. However, regulators exhibited bias in favour of GM, dismissing research findings that could possibly harm the biotech industry...With the current accumulated evidence, regulators should be answering charges of criminal

negligence in continuing their campaign of denial and misrepresentation while failing to impose a ban on further GM releases until and unless they have been proven safe by thorough independent investigations.”

Dr Ho emphasized that “regulators persistently ignored all evidence of hazards submitted to them, instead continuing to misinform the public by citing highly flawed studies that claim to find ‘no effect’.

Scientists have been drawn into a tightly closed loop of self-reinforcing ‘advocacy science’ that deliberately excludes not just counter-scientific evidence but also input from the real world. Advocacy has but one goal – to smooth the passage of GM produce into the market, without regards for safety or moral, ethical concerns.”

“We do not know how many other transgenic lines have proven unstable that continue to be given positive opinion and approval for the market. The lack of transparency and the increasing tendency to misuse business confidentiality has kept information crucial for risk assessment and risk management out of the public domain.”

In the meantime, GM foods are still being sent to Africa as ‘food aid’, after widespread rejection and protest, putting millions of the most hungry and vulnerable people at risk from GMO health hazards, threatening long-term food supply contamination.

Concluding, Dr Ho reiterated that GM contamination is almost invariably underestimated. Her organisation demands that independent science and scientists are needed who take the precautionary principle seriously. Dramatic changes are needed in science funding and scientific advice to the government. This particularly applies to the regulatory agencies entrusted with the task of protecting the environment, human, animal and plant health, in which they have failed so far. A complete ban on any further GM releases should be imposed until and unless they have been proven safe by thorough independent and peer-reviewed investigations.

Betty Price was the next speaker, specialising in agricultural biotechnology issues at GeneWatch UK (www.genewatch.org). The organisation monitors developments in genetic technologies from a public interest, environmental protection and animal welfare perspective. The organisation also carries out their own research as well as supports research of other organisations. Looking at all aspects of genetic technologies from GM crops and foods to genetic testing of humans, the organisation is also working together with Greenpeace to monitor GM contamination incidents (www.gmcontaminationregister). These records include findings of unintended GM contamination of food, feed or related wild species from GM crops or other organism; illegal plantings or releases of GM organisms and negative agricultural side-effects (i.e. agricultural problems arising from the GM organism and how it is managed).

Ms Price’s talk revolved mainly around false industry claims about new genetic technologies, including genetic modification, cloning and genetic testing, that could revolutionise food, agriculture, industrial production and medicine. However, technical difficulties in introducing complex traits such as drought-resistance, enhanced nutritional value or drug production have not brought these claims to fruition.

Governmental regulations aimed at health, environmental and consumer interests have only narrowly defined risk assessments, leaving little room for precautionary measures in the face of scientific uncertainty; irrespective of other obligations under international law. The organisation criticises DEFRA’s Co-Existence Regime 0.9% threshold and furthermore demands that DEFRA’s current “environmental liability directive” (ELD) for GM, should be

much stricter in fining GM companies and forcing them to carry all clean-up costs, caused by their damage to the environment. There are still a lot of loopholes in the directives and to give the go-ahead of commercialising GM foods into Europe will involve huge social costs, the biggest impact among other things being removal of choice of the public not to eat GM foods.

Dr Jean Monro, a consultation physician and medical director at the Breakspear Hospital, UK spoke about allergies and intolerances that induce various disease conditions, with mild to more severe symptoms. Allergies are evoked by foreign bodies (antigens) on internal or external body surfaces. Foreign bodies like foods, chemicals, inhalant allergens, even electrical currents or radio frequencies combined will increase the likelihood of allergies in the population, especially in very sensitive people. Allergens can include anything from organic or inorganic man-made chemicals (i.e. plant toxins), petrochemical derivatives, chlorinated hydrocarbons, to internal enzyme systems and even electromagnetic impulses from the environment. Many individuals have limited ability to break down all toxins from external or internal environmental influences, affecting lymphatic and nervous systems, since many nerve cells are not surrounded by a protective sheath (i.e. ganglionic cells).

The body is designed to cope with a variety of toxins during detoxification processes and it is important to consider the total overall body load of all foreign influences. However, the human body has not yet evolved to cope with various combinations of many of these, including the effect of GM foods.

The rapid industrialisation and environmental pollution is predominantly thanks to corporate organisations and international governments striving for economic profits for individual, national and international wealth. Dr Monro emphasised that more effort should be made to learn how to live and cope with this man-created environment, and to learn how to de-pollute the environment itself, as well as the people living in this environment. Most people in the western industrial world live in 'electrical smog' as well as a "chemical soup". It is therefore no wonder that allergies are dramatically on the rise. Immunotherapy will be more and more important, and it should be essential for environmental medicine to look at the implications of GM crops on environmental and human health.

It is now widely known that GMOs will increase the likelihood of introducing new allergens into the environment and other living organisms. This, on top of the current environmental toxic load that we have to deal with, will inevitably bring more health concerns, in terms of allergies and the risk of a variety of new disease conditions.



Dr Bruce Pearce explained DEFRA's Co-Existence Regime and its implications. Dr Pearce is deputy research director at the Organic Research Centre, Elm Farm (www.efrc.com), as well as director of the GM Freeze. His organisation researches the impacts of GM on organic farming, is a founding member of the 5-Year-Freeze ("GM Freeze", www.gmfreeze.org), and through its publications and representation on committees/forums delivers Government and public advice.

The Organic Research Centre calls DEFRA's Co-Existence Regime a "licence to pollute". It demands that suggested separation distances must be greater than the distance that pollen is modelled to be able to flow. The separation distances for seed contamination production must be set at lowest detectable levels. There should be clearer and more transparent notification processes, while requirements to notify 'neighbours' within the 'separation distance' should be extended to a greater distance. It is essential to include non-commercial gardeners, allotment holders and beekeepers in the notification process, and not only 'commercial' farmers. A GM public register is essential. The GM industry should carry the full

direct and indirect costs of liability and compensation in case of environmental and public health contamination, as well as any financial loss by non-GM farmers. The GM industry should also carry the costs of monitoring the regime. The organisation believes that the recommended “threshold” of 0.9% for truly accidental contamination in the final product should be set for food labelling purposes. However, processes should be put in place to insure that GM contamination in the field are at lowest detectable zero levels.

The final speaker was **Helena Paul**, member of the GM Freeze board (www.gmfreeze.org). GM Freeze is an alliance of UK organisations campaigning for a moratorium on the commercial use of GM in food and crops until vital questions about their impact have been resolved.

Ms Paul predominantly spoke about the negative impact of the bio-fuel hype that is bound to increase adoption of GM. Exclaiming that “the automotive- and oil industry are hopping into bed with the GM industry”, by referencing her book from 2003, entitled “Hungry Corporations”. Environmental concerns around climate changes invoked the more recent hype on bio-fuels, using non-fossil plant materials. Producing bio-fuels, however, will inevitably increase the loss of livelihoods, total water depletion, tropical forest destruction, and increased adoption of GMOs.

The GM industry uses gene modification of plants like soya, canola (oil seed rape), and cotton to provide the highest possible harvest results. Extremely large amounts of non-fossil plant materials are needed to produce only a small percentage of bio-fuels. Therefore, large amounts of agricultural land are needed for the production of bio-fuels. Food shortages have already appeared in the US, partly because of the race on bio-fuels. Millions of dollars of research goes into this sector, trying to alter plants so that they break down more readily to produce bio-fuels (e.g. through modification of a plant’s lignin content, or the introduction of artificial forms of lignin and other substances). One example was introduced by the company Syngenta that produced corn with specific enzymes to enable faster plant tissue breakdown. Oil seed rape is one of the plants hoped to become one of the main sources of bio-fuels. However, this plant is particularly contaminating, because its pollen can travel very long distances further increasing the risks of cross-contamination.

GM Freeze demands that laws should be introduced that make biotech companies strictly liable for harm caused by their GM products. The public should have the right to choose GM-free food. The Public should be involved in decisions about GM food and the use of patents in agriculture. Independent research into the safety and impact of GM foods and crops should be undertaken. Commercial and “corporate confidentiality” has been used by biotech companies as a tool to keep necessary information on their GM products and research studies from the public and regulators.

The alliance further demands a general, much wider debate on GM contamination, not one that is entirely designed for the GM industry’s participants. The 0.9% threshold proposed by DEFRA is unacceptable and co-existence discussions should persist in the UK, until the government agrees on lowest detectable zero-levels.

Coincidence?

This conference coincided with an article in the *Daily Mail* newspaper about a current GM experiment on rice by the California-based company, Ventria Bioscience. The company wants to insert three human proteins from breast milk and saliva (lactoferrins, lysozymes) into three different rice varieties. Each rice variety will be inserted with one of those three human genes. These proteins, which act in the human body as natural bacteria-fighting compounds,

are claimed to help fight stomach bugs and diarrhoea, life-threatening problems, particularly in third world countries.

The company has been given preliminary approval by the US Drug Administration (USDA) to use 3,000 acres of land in Kansas for this experiment. More worryingly, Ventria is also planning to harvest these new proteins to include them in other food products meant for human consumption (i.e. drinks, yoghurts, desserts and muesli bars). The company cultivated and copied these genes, to produce a synthetic laboratory version of those specific human proteins.

Ventria Bioscience representatives insist that any concerns about safety would be based on perception and not reality, claiming that they have taken all precautions necessary. The company further noted that producing therapeutic compounds in plants is a much cheaper method, since raw materials used are only the soil, water and sun. This would make (drug) 'therapy' more affordable for third-world countries.

Other organisations like Friends of the Earth demand a ban in the production of drugs in food crops by using genetic engineering. Measures should be introduced to prevent illegal GM crop contamination in our foods. No proper liability and compensation regulations have yet been introduced. Biotech companies should therefore be liable for any damage that their GM products will cause.

Using GM plants for the production of medical drugs, seems to be just one more excuse for the big biotech companies to make bigger profits faster, without any consideration for environmental contamination and the huge health hazards that these GMO products bring with them.

Summarizing the Main Problems with GM Foods

Cross-Pollination Risk: Conventional and organic crops are in danger of GM contamination by other crops due to inappropriate separation distances and the difficulty to monitor this process. GMOs are taken up by other organisms like beetles, which can travel more than 5km. GMOs can also be taken up by other micro-organisms in soil and water posing wide ranging environmental and public health risks of uncontrollable GM contamination even before food processing and storage.

Positional Effects: Genetic engineering doesn't insert a gene in a particular position. Instead, it mostly will end up in a random location within the genetic material that could disrupt existing genes at that particular location.

Uncontrolled Genetic Expression: DNA is located in every single cell of a living organism (plants or animals). However, only a very limited number of genes are expressed at any one time, depending on the type of cell. Their specific expression is in turn regulated by limited functional genes in different locations. Genes do not work in isolation, however, they interact with each other. Each gene has several functions, not only one. GMO action in genetic material is **not** controlled. It will operate constantly in every single cell; hence their effects on the living organism could be wide ranging.

Horizontal Gene Transfer and DNA Recombination: Foreign genes are inserted into e.g. plant cells, and other genetic material of bacterial and viral origin is introduced. This risks being introduced into and taken up by e.g. gut bacteria or other micro-organisms, creating completely new gene combinations (recombination and 'jumping genes'). This in turn will inevitably lead to new viral or bacterial diseases, and spread antibiotic and drug resistance to the disease agents. This will make it harder to treat infections.

Genes in an original organism are normally regarded as 'safe'; however they are **not** 'safe' in a GMO.

New Allergies: Genetic engineering in general introduces new proteins, and new genes introduced into the genetic material induce new protein synthesis, which can cause allergic reactions.

Increased Toxic Residues in Food: Creating herbicide-resistant plants will not only allow increased herbicide application on the plant at an earlier stage of growth, but will also encourage increased use of other agrochemicals by farmers. This is contrary to what the GM industry claimed to achieve with the creation of herbicide-resistant plants.

General Conclusion

The general conclusion of the conference was that GM contamination of foods should not be allowed at a threshold of 0.9% as proposed by DEFRA. Instead it should aim for lowest detectable zero levels, if not the complete prohibition of GM use, until independently proven as safe. For GM use to be proven as 'safe' more independent and peer-reviewed safety trials and research on long-term health and environmental effects are essential.

The use of GM foods and feed goes against the general principles for safe and sustainable food production. Public statements of biotech companies provide misinformation by presenting genetic engineering as being a precise technique. Instead, many scientists confirm its inherently random outcome that introduces many new risks. Genetic engineering processes and technologies as a whole are therefore highly questionable, not just GMOs. Biotech companies do not fully address these problems in terms of public information or testing procedures.

Despite the fact that enough scientific evidence already exists, showing the short- to mid-term implications on human and animal health as well as the environment, these factors still seem to be largely ignored by industry, government and regulators. The long-term impact and implications of GM crops for the environment and public health is wide-ranging, and can no longer be ignored, especially not by those organisations that claim to act on behalf of the public, the environment and the protection of human rights.

All speakers are planning to appear again in front of the European Commission in Brussels in May 2007 to present their above highlighted views and findings to speak out against DEFRA's 0.9% co-existence regime.

By Lara Walter, March 2007

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Genetically Modified Crops and Human Health

Presentation to Government

At

Central Hall, Westminster.

(Methodist Hall)

Tuesday 6 March 2007

9am – 5pm

Booking fee: £10 + £10 if buffet lunch is required.

BOOKING ESSENTIAL – AS SOON AS POSSIBLE

Lunch booking must be before Wednesday 27 February 2007

Opening Address by Margaret, Countess of Mar

Speakers:

Dr Gundula Azeez	The Soil Association
Dr Margi Ennartson	HDRA Organic Gardeners
Dr Mae-Wan Ho	Founder, Independent Science in Society
Professor Malcolm Hooper	Scientific Adviser to Gulf War Veterans
Brian John – Farmer	‘Keep Wales GM Free’
Professor Carlo Leifert	PLD, Dip Agr
Dr Jean Monro	Consultation Physician, Breakspear Hospital
Dr Bruce Pearce	Elm Farm Organic Research Centre
Betty Price	Gene Watch

Each Speaker will only have time to give Bullet Points, but full copies of all presentations will be available later

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'DEFRA proposals for GM crops to be grown in the UK'

'It is proposed that compliance with statutory requirements will be checked by DEFRA farm inspections also that there will be a Review after 2-3 years to see if these arrangements are satisfactory'.

Vera attended a meeting at the House of Commons of the FFA on 1 February.

She says: 'There has been no provision if cross-pollination from GM crops contaminates non GM or organic produce'.

DEFRA says: 'A co-existence regime will help to facilitate the introduction of GM crops'.

Vera says: 'Two years ago we held a conference and Dr Sue Mayer of Genewatch gave a lecture on GM crops including those producing drugs etc, which has led to further research both scientific and medical.

This Conference on 6 March is therefore very important.

Please attend if you can.

Also, please publicise this conference and encourage others to attend.

I want the Hall to be FULL!

For those attending –

TABLES WILL BE AVAILABLE FOR YOU TO DISPLAY YOUR ORGANISATION'S
INFORMATION / PUBLICITY MATERIAL.

Please add this request when booking.

A very sincere thank you to all who are coming, and who are publicising this important event.

I really do appreciate this help

Bless You

Vera

VERA CHANEY