

Furthermore, even though it has been officially acknowledged that current safety regulations are seriously flawed, they continue to be used as the basis for assessing potential risks to the environment and human health. A comprehensive five year moratorium during which the public decides whether GE crops and foods are needed and whether or not the risks are justified is the only logical response.

References

- 1 Statements by Michael Meacher, Environment Minister, and Jeff Rooker, Food Safety Minister, to the Lords Select Committee, 21st October 1998.
- 2 Interviews conducted with 950 adults aged 15+. Interviewed face-to-face, in-home, using CAPI (computer assisted personal interviewing) technology between 6-8 June 1998 in 84 sampling points throughout Great Britain. Data have been weighted to reflect the national profile. Trend information has been included from a MORI/Greenpeace poll: 1,003 interviews among adults aged 15+ were conducted by telephone between 13-15 December 1996. Data have been weighted to reflect the national profile.
- 3 See GeneWatch Briefing No.1 'Genetically Modified Foods: Will Labelling Provide Choice?'
- 4 Biotechnology and the European Public Concerted Action Group (1997) Europe ambivalent on biotechnology. *Nature* 387: 845-847.
- 5 Grove-White, R., Macnaghton, P., Mayer, S. & Wynne, B. (1997) *Uncertain World. Genetically modified organisms, food and public attitudes in Britain.* Centre for the Study of Environmental Change, Lancaster University: Lancaster. 64pp.
- 6 See Bruce, D. & Bruce, A. (1998) *Engineering Genesis. The ethics of genetic engineering in non-human species.* Earthscan: London.
- 7 See GeneWatch briefing No.3 'Genetic Engineering: Can it Feed the World?'
- 8 Mayer, S., Hill, J., Grove-White, R. & Wynne, B. (1996) *Uncertainty, Precaution and Decision Making: the release of genetically modified organisms into the environment.* Global Environmental Change Programme Briefings Number 8. Global Environmental Change Programme: University of Sussex.
- 9 GeneWatch (1998) *Genetically Engineered Oilseed Rape: Agricultural Saviour or New Form of Pollution?* GeneWatch: Tideswell, Buxton.
- 10 The Guardian 9th July 1998.
- 11 See GeneWatch Briefing No 2 'Genetically Engineered Oilseed Rape: Agricultural Saviour or New Form of Pollution?'
- 12 Rissler, J. & Mellon, M. (1993) *Perils amidst the promise. Ecological risks of transgenic crops in a global market.* Union of Concerned Scientists: Cambridge, MA.
- 13 ENDS Report 283 August 1998 p.22.
- 14 Union of Concerned Scientists (1994) *Experimental release of genetically engineered organisms.* The Gene Exchange 5:12.
- 15 Kareiva, P. Parker, I.M. & Pascual, M.P. (1996) *Can we use experiments and models in predicting the invasiveness of genetically engineered organisms?* *Ecology* 77: 1651-1675.
- 16 OECD (1993) *Concepts and principles underpinning safety evaluation of food derived from modern biotechnology.* OECD Group of National Experts on Safety in Biotechnology, OECD: Paris.
- 17 ACNFP Annual Report, 1994, MAFF & DoH; Submission to the ACNFP from Monsanto Europe dated 27th July 1994. British Library Supplement BL SUP No 11093.
- 18 Taylor, S.L. & Lehrer, S.B. (1996) *Principles and characteristics of food allergens.* *Critical Reviews in Food Science and Nutrition* 36(S): S91-S118.
- 19 Fax to GeneWatch from Zeneca Plant Science dated 5th November 1998.
- 20 Agrow 296 January 16th 1998 p.9.
- 21 The Norwegian 1993 Gene Technology Act at Section 1 'Purpose of the Act' demands that '... the production and use of genetically modified organisms takes place in an ethically and socially justifiable way, in accordance with the principle of sustainable development and without detrimental effects on health and the environment'.
- 22 SCIMAC News Release 21st October 1998. SCIMAC welcomes Government backing for managed approach to GE crop introduction.
- 23 Advisory Committee on Novel Foods and Processes. Sub-group on post-market monitoring. Minutes of meeting held on 16 March 1998.

GENETICALLY ENGINEERED CROPS AND FOOD: The Case for a Moratorium



Briefing Number 4
November 1998

This briefing examines the justification for a comprehensive moratorium on genetically engineered crops and food and outlines the issues which must be addressed while such a moratorium is in force.

Many organisations including English Nature, the Royal Society for the Protection of Birds (RSPB), Friends of the Earth and GeneWatch are calling for a moratorium on the growing of genetically engineered (GE) crops and/or marketing of GE foods for periods of up to five years. The Government's response¹ has been to:

- establish a Cabinet Committee to deal with biotechnology
- consider a 'stakeholders forum' to advise on the environmental risks
- create a mechanism to monitor the effects of GE food on human health
- limit and monitor - in collaboration with industry - the first commercial growing of herbicide resistant GE crops.

The GE industry's response has been to announce that it will not plant GE insect resistant crops in the UK for three years¹.

It is very significant that both the Government and industry have finally acknowledged that a real problem exists, but their proposals fall a long way short of addressing fundamental concerns about GE crops and foods. This can only be achieved by introducing an immediate moratorium.

Why a Moratorium?

A moratorium must be sufficiently comprehensive to withdraw all licences for the commercial cultivation of GE crops and suspend the importing and marketing of all GE foods. This should remain in force for a

minimum of five years to allow adequate time for public debate and research into the potential risks to the environment and human health. Only then will it be possible to address:

- the overwhelming public opposition to genetic engineering and its products
- the inadequacy of current environmental and health safety regulations
- the potential for adverse effects on agriculture and food production.

Public Opposition

GE soybean and maize are already being imported into the UK and can be found in 60% of foods on supermarket shelves, most of which are not labelled (see Box 1). There is a great deal of evidence, however, that the British public do not welcome the use of GE ingredients in food. A recent MORI/GeneWatch poll showed that 77% of the British public want a ban on the growing of GE crops until their impacts have been more fully assessed. A similar number (73%) are concerned that GE crops could interbreed with natural, wild plants and cause genetic pollution. The poll also reveals that 61% of the public do not want to eat GE foods (an 8% increase since a similar MORI poll was conducted in December 1996) and 58% of the public oppose the use of genetic engineering in the development of food (a 7% increase on 1996)².

It seems, therefore, that a technology is being imposed for which there is little support.

GeneWatch



The Courtyard, Whitecross Road, Tideswell, Buxton, Derbyshire, SK17 8NY, UK
Phone: 01298 871898 Fax: 01298 872531 E-mail: gene.watch@dial.pipex.com

Website: <http://www.genewatch.org>

Subscribe to *GeneWatch's* briefing series for news on genetic engineering developments.
For six issues: £12 individuals, £6 concessions (Europe £15, other overseas £20)
£100 businesses, £30 voluntary and educational organisations.

BOX 1: The Great Pretence - Labelling of Genetically Engineered Foods does not Provide Choice

An EC Regulation came into force on 1st September 1998 specifying when and how products containing GE soybean and maize ingredients should be labelled. Other GE foods will be covered by the Novel Foods Regulation which takes the same approach. Overall, the result is a confusing muddle.

Many GE foods will not be labelled. This is because the regulations ignore *the means of production* (genetic engineering) and only consider *the content of the end product*. Products therefore only have to be labelled if they contain foreign protein or genetic material (DNA). Consequently:

- Products containing GE soy flour (which may be found in foods such as bread or baby foods) or whole GE soybeans must be labelled with phrases such as '*contains genetically modified soya*' because foreign protein and DNA are present.
- Products containing derivatives of GE maize (e.g. starch) or GE soybean (e.g. oil or lecithin) will *not* be labelled because protein and DNA are removed during their production. These products are often found in a whole array of foods including vegetable oils, prepared meals and chocolate.

Anomalies such as these demonstrate that the regulations fail to meet public demands for clear and comprehensive labelling. People want to know *how* their food is produced so that they can make informed decisions on whether to accept or avoid it³. Current regulations mean that the consumer is deprived of the right to choose.

Although public opposition to GE foods has been said to be due to a lack of knowledge about the technology, the evidence does not bear this out. Comparing the results of European surveys in 1991, 1993 and 1996, shows that knowledge about the technology has increased in Europe but optimism about its ability to improve the quality of life has decreased⁴. The 1996 results also demonstrated that 74% of the European public support labelling of GE foods; 60% believe there should be public consultation about new developments; and just over half (53%) feel that current regulations are insufficient to protect people from the risks of the technology.

Qualitative research consistently supports the opinion poll results⁵. It demonstrates that public concerns about the technology are complex and include:

- fears that the risks are likely to be unpredictable;
- scepticism about scientific assurances of safety in the light of the BSE crisis;
- moral unease about transferring genes between species in a way which is unnatural;
- a feeling that the technology is being driven by profit and not the public interest;
- a lack of control about where the technology is going;
- doubts that GE foods are necessary because '*food is fine as it is*'.

Fears regarding the environmental and human health risks of GE crops and foods are not the only reasons for public opposition to genetic engineering. For many people, it is the very process itself - the transfer of genes between species - which raises serious moral concerns. Other issues such as the patenting of genes, cells and plants - which are fundamental to the commercialisation of the technology - also raise questions of morality. In a democracy, it is essential that such views are respected and taken into account⁶.

Despite the weight of public opinion, however, concerns over the justification for,

least five years. At the end of the five year period, and in the light of the outcome of the above, the Government must decide whether the moratorium should remain in place or be partially or completely lifted.

Conclusions

Whilst the official recognition that there are serious issues to address is welcome, the Government's proposals fall a long way short of what is required and demonstrate a continued intention to collaborate with the genetic engineering industry.

The proposed 'stakeholders forum' would have no statutory basis and could easily turn into a talking shop which would stifle criticism. Public interest representatives may have little influence on the outcome of the debate since they lack the resources of industry, which is already controlling events. Although the Environment Minister made it *sound* as if controlled commercial growing of herbicide resistant crops for one year would lead to a full re-evaluation of their future, it is clear that the industry does not see it this way. The first monitored commercial growing is being conducted in collaboration with the industry body SCIMAC (Supply Chain Initiative on Modified Agricultural Crops), which views the process as a mechanism to refine codes of 'best practice'²² rather than an assessment of the practice itself. In any event, one year will certainly be inadequate to fully evaluate the environmental effects of commercial cultivation.

The industry announcement that there will be a self-imposed ban on growing GE insect resistant crops in the UK for three years will make little difference as there were never any plans to plant such crops during that period. Industry has therefore conceded nothing while gaining PR capital at the same time. Also, and in a demonstration of double standards, Novartis continues to market its GE insect resistant maize in the rest of Europe whilst acknowledging problems here. These sorts of contradictions underlie the requirement for a moratorium to be controlled by the Government and not by the industry. Making decisions about the introduction of a new technology is a matter for society and its democratic processes, not profit motivated companies. To maintain any credibility, the Government must distance itself from the industry and base its decisions on research and evaluations which are entirely independent.

The Government's proposals also include monitoring the effects of eating GE foods. However, the public has not given its prior informed consent to act as guinea pigs and effective monitoring will, in reality, be impossible without the effective segregation and comprehensive labelling of GE foods. The Government's advisors have already admitted the scale of the difficulties involved²³ and unless adverse effects are catastrophic, they are likely to remain undetected.

Therefore, the Government's response to mounting concerns about GE foods and crops has been weak and will only serve to confuse the debate. The absence of a ban on importing GE foods and ingredients and inadequate labelling schemes mean that people will still be eating GE foods whether they like it or not.

The Government's proposals fall a long way short of what is required.

Making decisions about the introduction of a new technology is a matter for society and its democratic processes, not profit motivated companies.

Current regulations fail to meet public demands for clear and comprehensive labelling.

future, GE crops and foods will be forced on the public, growers, food producers and retailers alike.

Unless steps are taken now to avoid cross-pollination and to demand segregation, genetic contamination will become so widespread that the process will be irreversible.

The Scope of a Moratorium

The scale of public opposition, the lack of confidence in present safety regulations, the pervasive effects on food production and the removal of the right of people to reject a morally contentious technology mean that a moratorium must be comprehensive. Because the issues will not be resolved quickly, it must also remain in force for a minimum of five years.

In order to be effective, a moratorium must include a ban on the commercial growing of GE crops, the importation of GE food and ingredients and their use in human and animal feeds.

During the moratorium, the following steps will need to be carried out as a minimum requirement to inform the Government's decision about the future of GE food and crops in the UK:

- **Extensive public consultation and complete assessment of the social and economic impacts of genetic engineering.** This must focus on the future of agriculture and food and any role that genetic engineering may or may not play. Moving the focus from GE foods alone to the broader questions of agricultural and food policy is essential for a rounded debate. This will require the use of consultative and other techniques such as citizens juries, consensus conferences and multi-criteria evaluation. There must be a political commitment that the outcomes of these studies will influence policy decisions.
- **Fundamental revision of environmental and human safety regulations in the EU.** As well as addressing the shortcomings identified above, regulations should allow for an assessment of whether GEOs are morally justified and comply with commitments to sustainable development as is demanded, for example, under Norwegian law²¹. This would enable the outcome of the public debate and research findings to influence decision making.
- **Independent research on the ecological effects of GEOs.** This must be independently planned following discussions with ecologists, agronomists, and other scientists. It must include research to investigate the interactions between GEOs and agricultural practices and their effects on biodiversity and farming systems.
- **A comprehensive labelling strategy.** This must ensure that all foods are labelled as such if they have been produced using GE ingredients, regardless of the content of the final product. The source of any foreign genes must also be included on labels.
- **Development of an effective system to segregate GE from non-GE foods.**

Rigorous scientific research coupled with public debate and discussion will take at

and safety of, genetic engineering have been largely disregarded by Government and industry. On the contrary, the Government has actively supported the biotechnology industry in terms of research funding and initiatives to encourage its promotion.⁷.

The depth and extent of public concern can no longer be ignored. A moratorium is vital to give the public the opportunity to influence future developments.

Inadequate Safety Regulations

In recent years, research into the risks of genetic engineering has demonstrated that previous assumptions of safety are seriously flawed and that complacency could result in widespread and irreversible damage to the environment and human health⁹. Despite this, current regulatory processes are weak and ill-conceived, casting severe doubts on their ability to ensure the safety of genetically engineered organisms (GEOs).

BOX 2: Environmental Safety Regulations

The environmental safety of GE organisms is addressed by a European Directive called the 'Deliberate Release Directive' (90/220/EEC). In the UK, the Secretary of State for the Environment (who actually licenses all experimental and commercial uses of GEOs) is advised by the Advisory Committee on Releases to the Environment (ACRE), a committee of experts which includes industry representatives. ACRE considers the safety of releases on a step-by-step, case-by-case basis. Each GEO is tested in the laboratory, then in greenhouses and then in outdoor fields. The assumption is that the information from each stage will show whether it is safe to reduce the level of containment. The focus is on the GEO itself and what effects it may have, such as becoming a problem weed or the foreign gene moving into related species.

There are many shortcomings in this approach:

- **A case-by-case approach precludes an assessment of cumulative impacts.** For example, one crop containing a toxin which kills insects may seem relatively innocuous. However, if many such crops are authorised, the toxin could affect the whole food web either by killing beneficial insect life or by removing an important food source for higher species. This is not specifically included in the risk assessment.
- **Secondary effects on biodiversity as a result of the effects of GEOs on agricultural practice and vice versa are not considered.** For example, the introduction of GE herbicide resistant crops will increase the use of some broad spectrum weed killers¹¹. By removing weeds more effectively, food sources for insects and birds will be reduced, possibly threatening bird populations still further.
- **Effects on other farming systems are not considered** - for example, the problems of cross-pollination of organic and conventional crops. GE oilseed rape pollen can travel 1.5 to 2 kilometres⁹.
- **Small-scale trials cannot mimic the complexity of the natural environment**¹² - unexpected outcomes are probable and ACRE's chairperson, Professor John Beringer, has even acknowledged that, "We can't really learn anything from them [small-scale field trials]."¹³ Despite this admission, he and his committee continue to approve GE crops on the basis of such trials.
- **Most experimental trials only provide information on economic characteristics such as yield, little of which is relevant to risk assessment**¹⁴. There is minimal research into ecological effects and, when undertaken, is only conducted for one to two years. Ecologists have recommended that at least three years data are needed¹⁵. Therefore, there is little relevant information with which to make assessments of safety.

The Government has actively supported the biotechnology industry in terms of research funding and promotion.

Previous assumptions of safety are seriously flawed.

The independence of the committees advising the Government on safety has been seriously questioned.

The restricted scope of the assessments; the neglect of possible effects on biodiversity, agriculture and diet; what constitutes an acceptable risk; whether benefits should be explicitly included; and the extent to which the experimental trials can address the safety issues have all been raised as problems^{8,9}. The independence of the committees advising the Government on safety has also been questioned. Friends of the Earth have identified links between the Advisory Committee on Releases to the Environment (ACRE) and the industry, and Julie Hill of the Green Alliance (the only environmentalist on the committee) has commented that “*Most of the panel come with a positive view of the technology. It might be possible to have a different view of the risks GMOs pose if ACRE had more people critical of the technology.*”¹⁰

With regard to environmental safety, Michael Meacher, the Environment Minister, has acknowledged that there needs to be a revision of the regulations to ensure that all potential risks are addressed¹. The European Commission has also recognised the need for improvement and plans to increase the scope of the Deliberate Release Directive (see Box 2) to cover direct and indirect, short and long term effects, compulsory monitoring plans and a seven year review period. Given such official admissions that current safety regulations are inadequate, there can be no justification for proceeding with any commercial cultivations of GE crops until the regulatory processes have been drastically improved. An immediate moratorium is therefore essential.

BOX 3: Assessing the Safety of Eating GE Foods

The safety of GE foods is addressed by the Novel Foods Regulation (258/97) and is the responsibility of the Ministry of Agriculture, Fisheries and Food. The Minister is advised by the Advisory Committee on Novel Foods and Processes (ACNFP). The ACNFP uses the concept of ‘substantial equivalence’ to determine whether there are food safety questions to answer¹⁶. Under this principle, if the GE food is chemically the same as the traditionally produced variety, there should be no reason for concerns about safety regardless of the way in which it has been produced. Assessments of whether the changes could trigger allergic reactions also have to be made.

The shortcomings of this approach are that:

- **Chemical differences may be very small and not identified in tests, therefore leading to a false assumption of safety.** The adverse effects of eating BSE infected beef would not have been identified by such an analysis.
- **Crops are not assessed in the context of use.** The ACNFP approved the safety of Monsanto’s Roundup Ready soybean, for instance, without considering the safety of the soybean when it had been sprayed with Roundup herbicide, even though this was the primary reason for its development in the first place¹⁷.
- **Although there are tests based on known allergens to try to identify the allergenic potential of new food, there are always exceptions.** The assessment of the allergic potential of Monsanto’s soybean by the ACNFP was ‘*theoretical*’¹⁷. Questions about exposure to novel proteins will always be difficult because: “*The allergenicity of specific proteins derived from known allergenic sources can be determined, whereas the potential allergenicity of proteins derived from sources of unknown allergenicity is much harder.*”¹⁸
- **Short term laboratory experiments with animals are not foolproof as unexpected side effects of drugs have shown.** They also raise questions of animal welfare. This is one reason why the Vegetarian Society has announced its opposition to GE food.
- **Because there is no segregation of GE from non-GE foods, monitoring for effects will prove difficult if not impossible.**

There can be no justification for the commercial cultivation of GE crops until the regulatory processes have been drastically improved.

Current regulations to ensure the safety of GE foods are no less flawed than those governing the environmental risks of growing GE crops (see Box 3). Although it is argued that GE foods are subjected to much closer scrutiny than many conventional foods, with such a new technology - and especially where there is scientific uncertainty as to the potential health risks - it is essential that assessment procedures err heavily on the side of caution. However, there are as yet no plans to revise the regulations. To compound the situation still further, the Government has even shelved plans for a Food Standards Agency, and the outcome of the BSE inquiry - which will have important lessons for food safety - has yet to report. In the meantime, a multitude of GE foods remain available for public consumption.

Current safety regulations cannot command confidence. Therefore, the commercial cultivation of GE crops and marketing of GE foods cannot be justified until a moratorium is introduced to allow time for a complete reappraisal of the regulations.

Compromising Non-GE Food Production

The results of public attitudes research show that there is a healthy market for non-GE foods. For instance, Zeneca’s GE tomato puree (sold as own brand in Sainsbury’s and Safeway) is 20% cheaper than conventionally produced tomato puree, yet only outsells the latter in ‘*some stores*’¹⁹. Consumers therefore seem prepared to pay more to avoid GE foods and this includes buying organic foods, which are guaranteed to be GE-free. However, because of the lack of investment in organic systems and the lack of accounting for the environmental and other costs of conventional agriculture in food prices, organic produce is relatively expensive. Avoiding GE foods may therefore become a choice which is denied to people on low incomes.

Even for those who can afford them, however, the availability of non-GE alternatives cannot be guaranteed in the long term. Firstly, by allowing GE crops to be grown in the UK, farmers - both organic and conventional - may be unable to provide British consumers with the kind of food they want. Cross-pollination of organic or conventional crops by a GE variety is a very real possibility and recently led a Devon organic farmer to take legal action in an effort to halt the cultivation of GE maize on a test site adjacent to his farm. Genetic contamination of his sweet-corn crop would mean that it could no longer be classed as organic. Cross-pollination could also affect conventional farmers who want to provide for the non-GE market in crops such as oilseed rape (which is not produced organically in the UK). Oilseed rape outcrosses freely and, in Germany, cross-pollination from GE crops to neighbouring fields has already been identified.²⁰

Secondly, because neither the UK Government nor the European Union demand the segregation of the products of GE crops from those of non-GE crops, mixing and contamination are inevitable. This could take place during transport and processing. By not establishing separate streams for GE crops, food producers wishing to make products using non-GE sources may find they cannot source sufficiently pure stocks of ingredients.

Cross-pollination and lack of segregation therefore mean that, in the foreseeable

Avoiding GE foods may become a choice which is denied to people on low incomes.