THE ROYAL SOCIETY

May 1999
Ref: 8/99

GMOs and the environment

A response to the inquiry by the House of Commons Environmental Audit Committee

Introduction

The Environmental Audit Committee of the House of Commons initiated an inquiry into genetically modified organisms (GMOs) in March 1999 requesting comments on (a) the potential environmental impact of such crops and (b) the operation of the current regulatory and advisory framework for overseeing developments in biotechnology. The Royal Society welcomes the opportunity to comment and reiterates its recommendation for an overarching body that could advise on the wider ecological impact of GM crops, amongst other issues.

The Society has already produced statements on genetically modified organisms (*GM Plants for Food Use*, September 1998; *Regulation of biotechnology in the UK*, February 1999) and the scientific advisory system (June 1998). This response to the current inquiry draws on recommendations made in these earlier publications. The response has been endorsed by the Council of the Society, and was prepared by a group chaired by Professor Brian Heap FRS (Foreign Secretary and Vice-President, Royal Society). The other members were Professor Ted Cocking FRS (University of Nottingham), Professor Don Grierson (University of Nottingham), Professor Chris Leaver FRS (Oxford University), Dr Terry Rabbitts FRS (Cambridge University) and Dr Rebecca Bowden (Secretary).

(a) Concerns regarding the potential environmental impact of GM crops are set out in full in Part 4 of the Society's 1998 statement (*GM plants for food use*). The two main issues are the transfer of the introduced genes to wild plants and non-GM crops, and the indirect effects of the GM crops themselves on the local environment (e.g. effects on non-target insect and weed populations, and the possible development of resistant insects and weeds). The risk of problems arising from gene transfer is believed to be small, and ways to minimise it are presented in Section 3 of the 1998 statement. Indirect environmental consequences require strict monitoring and possible statutory restrictions on GM crops. The possible environmental benefits resulting from reduced use of chemical insecticides and herbicides should not be forgotten

(b) With regard to the regulatory and advisory framework, the main areas of concern that the Society recommends be addressed by Government are as follows (see also *Biotechnology regulation in the UK*)):

1. Use of an overarching body, to which specialist advisory committees would report, to take a broad overview of developments and concerns related to biotechnology, in particular the wider ecological impact of new developments

2. Improvement of communication and co-ordination between Government departments involved in the regulatory process
3. A presumption that scientific advice to Government will be made publicly available unless it is demonstrably against the national interest to do so

1. Is there a need to develop a strategy for assessing and managing the environmental implications of the release of GMOs?
- Should this strategy include the formal assessment of the environmental benefits for GMOs alongside their risks?

2. If so, does the Government have adequate mechanisms for developing such a strategy, in terms of:
-the co-ordination of existing policy and regulation;
- oversight of, and influence over, the direction of development of GMOs;
- the assessment of direct and indirect risks, including the cumulative impact of GMO releases over time;
- the contribution that GMOs might make to more sustainable agriculture?

Although genetic modification and the release of GMOs are tightly regulated in the UK, concerns have been expressed that there is no cross-departmental overarching body to monitor the impact of GMOs on agronomic practices or to look at the cumulative effects of GM crops, since applications are reviewed on a case by case basis. In 1994 the Biotechnology and Biological Sciences Research Council (BBSRC) held a Consensus Conference on plant biotechnology at which a cross-section of lay persons considered the implications of these technologies. We agree with the recommendation of this panel that the regulatory authorities should address the wider issues surrounding the introduction of GM commodity crops by putting in place a monitoring mechanism or overarching organisation (as set out in our recent publications *Genetically Modified Plants for Food Use* and *Regulation of biotechnology in the UK*).

We welcome recent moves by the Government to establish a Ministerial committee to oversee biotechnology; it is likely that this Committee will provide vital co-ordination of policy across departments. However, it will also be necessary to ensure that there is also some mechanism for taking a broad, well informed, overview of developments and concerns. In addition, there is a need for some mechanisms to obtain authoritative advice at short notice in response to public alarm over particular issues.

The reliance on a case by case approach in obtaining expert advice on GMOs for policy makers may result in a lack of analysis of the overall impact of the technology on agriculture and the environment, and of the long-term effects of GMOs. Whilst it is important that GM crops should not have a greater negative impact on the environment than non-GM crops, it should also be recognised that there may be potential environmental benefits in the use of such crops. Nevertheless, the following points are not adequately covered by the current regulatory and advisory committee system:

- consideration of the potential effects of GM crops in comparison with the effects of current agricultural practices in general on ecosystems and the environment as a whole.

- review of mechanisms by which GM crop plants could be monitored in the environment and recommendations for long-term monitoring of impact on ecosystems
- review of current guidelines for isolation of certified seed crops and high erucic acid oilseed rape and provision of recommendations regarding isolation of specific GM crops of concern (such as crops modified to produce pharmaceuticals) and possible statutory provisions
- review of available methods for minimising gene transfer to crops where such transfer may cause concern and recommendations regarding further research
- consideration of possible positive and negative effects of GM and non-GM insect tolerant crops on the ecosystem and provision of guidelines for growth of such crops and recommendations for further research, as applicable
- consideration of current guidelines for growth of GM and non-GM herbicide tolerant crops and the potential for statutory measures
- applications for herbicide use on a crop should be considered in conjunction with applications for release of herbicide tolerant crops. There should also be a mechanism by which the long-term impact of such crops on agricultural practices could be monitored

We therefore recommend that these issues be covered via extending the remit of the appropriate advisory committees. In addition, an overarching body is needed to have an ongoing role in monitoring the wider issues associated with the development of biotechnology in agriculture and food production. Such a body should consider those of the above issues that cannot be considered by individual advisory committees for practical reasons, such as wider issues affecting all applications of biotechnology. In addition, the Food Standards Agency and Ministerial Committee on biotechnology will have an overseeing role to play on some aspects of biotechnology. We acknowledge that many of the concerns raised cannot be addressed without the information gained from long-term small-scale field trials and laboratory work, and that research and monitoring must continue once crops are in commercial use.

Regarding the provision of scientific advice on GMOs to policy makers, the current use of a number of specialised advisory committees could be more efficiently co-ordinated if the Chairmen of such committees had an official forum in which to discuss concerns raised by their committees with respect to individual applications. It is also important for such issues to be reported to any overarching body responsible for monitoring developments as a whole. This would be possible if advisory committee Chairmen reported to such a body. It is equally important for the overarching body to have a means of communicating any concerns to the relevant advisory committees so that they may take action. The overarching body will
also need to include consumer and environmental representatives, to ensure a suitable breadth of knowledge to monitor wider issues and long term developments. Such a body could then give advice to the Ministerial committee set up to monitor Government policy in biotechnology. If the committee were able to advise on cross-departmental issues then they could co-ordinate both the funding of biotechnology research and the regulation of the end-products of such research.

3. What mechanisms exist, or are needed, for incorporating public values and concerns regarding the environmental implications of GMOs, alongside the results of scientific assessment, within the decision making process?

It is particularly important to take account of public values, and how these are formed, at all stages in any process of setting standards, as was outlined in the report of the Royal Commission on Environmental Pollution, published in 1998. However, in order to take account of such values there must be mechanisms in place to determine them. Biotechnology has many potential applications in human and veterinary medicine, agricultural practice, food quality, nutrition manufacturing and environmental protection. As a result it may also have immense industrial potential. Nevertheless, it is necessary to have adequate regulatory procedures in place to ensure all aspects of the technology are addressed.

We welcome indications that the current Government is seeking to conduct its affairs more openly. We recognise that confidentiality can often be important, but believe that a policy that favours extensive use of confidentiality and the Official Secrets Act, irrespective of need, is unhealthy and counterproductive. We support the approach set out by the Chief Scientific Advisor in 'The use of scientific advice in policy making' regarding transparency.

We also welcome moves by the Advisory Committee on Novel Foods and Processes (ACNFP) and the Advisory Committee on Releases to the Environment (ACRE) to increase transparency in the regulatory system by the publication of agenda and minutes, and ACNFP's initiative to convene open meetings. We recommend that other advisory committees involved in the regulation of biotechnology, such as those advising on pesticides, consider such measures.

We also recommend that greater information should be made available on the Internet. Web sites for individual Government departments involved in biotechnology regulation should be linked and should contain sufficient detail on the regulatory process, applications received, advice given to Government by non-departmental public bodies and the data considered during the formation of that advice. It may also be necessary to actively publicise the availability of such information so that interested parties (such as the Media) are able to use it. Mechanisms should be found to minimise the amount of information that needs to remain confidential.

We strongly endorse the recommendation of the Chief Scientific Advisor that there should be a presumption that scientific advice to Government will be made openly available, unless it is demonstrably against the national interest to do so.

The use of GMOs may offer a wide range of benefits and we support ongoing research in this field. However, we recognise that the technology and current regulatory system have aroused concern amongst some consumers, coming at the same time as other, unrelated, concerns about food safety, notably BSE and *E.coli* O157 food poisoning. It is important that such concerns are respected and accurate information is made available to will help consumers to make informed choices.

4. What is feasible and desirable in terms of preserving consumer choice by segregation and labelling - particularly the issue of 'labelling for process' to provide for consumer influence over the use of GMOs and their environmental implications?

An extensive discussion of problems related to labelling of foods containing GMOs and their derivatives may be found in Annex V of the Society publication *Genetically Modified Plants for Food Use*.

We strongly support the labelling of foods containing GM material, where the new foodstuff is substantially changed (according to specified criteria) from that of its conventional counterpart, to allow customer choice. We also recognise that in order to carry out labelling, segregation of commodity crops and derivatives through long supply chains on a global scale will be necessary to enable traceability and that this may cause difficulties..

For enforcement purposes, it will be essential to recognise a minimum level for adventitious presence of GM material, below which a product can be considered to be free of GM derivatives (particularly relevant for organic certification). Scientifically validated testing methods would have to be developed and agreed in order for such enforcement to be carried out in a reliable, readily repeatable and practical basis. We recommend that the regulatory authorities, the European Commission and relevant bodies work together to resolve this issue.

Any over-arching body set up to monitor biotechnology should also consider the current regulations and in particular, investigate methods by which information can be disseminated to all members of the supply chain in order for such labelling to be effective. In view of the imprecise nature of the regulations governing labelling, there is also a pressing need for the regulatory authorities to re-evaluate the requirements relating to the labelling of GM foods and ingredients, derived from each of the current statutory requirements and to distil from these general principles which can be applied equitably and uniformly to all current GM crops and to those likely to be approved during the foreseeable future.

5. What scope does the UK and EU have for policy initiatives, and what are the prospects for multilateral agreement, on the release of GMOs into the environment - with particular reference to the World Trade Organisation and GATT disciplines and obligations?

The Royal Society supports the move to develop an International Biosafety Protocol as a step towards the co-ordination of international legislation regarding genetically modified organisms. In particular, we recognise the need for the EU to liaise with both the US and the developing nations to coordinate the formation of future policies on GMOs. The UK may have a role in such initiatives by seeking greater liaison with the US on long-term policy initiatives. We have not commented on the interaction of any such legislation with other multi-national agreements since this is a matter for those with legal expertise.

6. Are there adequate arrangements for civil liability for environmental damage caused by GMOs?

We have not commented on the issue of liaibility since this is a matter for those with legal expertise.

1.1.1 **Additional information**

The Society would like to draw attention to the following Royal Society publications which are of relevance to this subject: *The Scientific Advisory System (June 1998), Genetically Modified Plants for Food Use (September 1998), Regulation of Biotechnology in the UK* (Feb 1999) and *Scientific Advice on GM food* (April 1999). Additional copies of this response and the above publications are available from The Science Advice Section at the Royal Society (rebecca.bowden@royalsoc.ac.uk tel: 0171 451 2588 fax: 0171 451 2692). All publications are also available on the Society's web page (www.royalsoc.ac.uk).