Wildlife & Countryside Link Position Statement on Genetically Modified Organisms

June 2006

Wildlife and Countryside Link (Link) brings together voluntary organisations concerned with the conservation, enjoyment and protection of wildlife, countryside and the marine environment. Our members practise and advocate environmentally sensitive land management and food production and encourage respect for and enjoyment of natural landscapes and features, the historic environment and biodiversity. Taken together, our members have the support of over eight million people in the UK and manage over 476,000 hectares of land. This statement is supported by:

- Bat Conservation Trust
- Buglife – the Invertebrate Conservation Trust
- Herpetological Conservation Trust
- The Wildlife Trusts
- The National Trust
- Plantlife International
- Royal Society for the Protection of Birds
- Woodland Trust

Summary

Link believes that there are still many important and unanswered questions with regard to the effects of Genetically Modified Organisms (GMOs) on the environment, biodiversity, animal welfare and consumer choice. Although it is possible that certain GMOs may have no environmental impact at all, or even produce environmental, biodiversity and consumer benefits, (such as less intensive farming and forestry practices), we have yet to see any evidence of these possibilities.

Link believes that the weight of current evidence is such that GMOs should not be approved for commercial release in England and that further scientific investigation is needed before GMOs are introduced commercially. Link therefore urges the Government to act in accordance with the precautionary principle and refuse commercial approval of GMOs until regulations can be improved, and GMOs can be shown, through rigorous scientific testing on a case-by-case basis, not to have any wider environmental, animal welfare or wildlife impacts before they are approved for release.

Background

Genetically Modified Organisms (GMOs) are the result of gene modification, a process which involves the artificial transfer of individual genes from one organism into another, which may include genes between non-related species. The aim is to produce a change in a plant or animal's biological characteristics and to confer a particular desired trait into the recipient organism. Organisms that contain an artificially inserted gene are known as 'transgenic'.

Genetic modification of commercial crops presently focuses on two main traits; herbicide tolerance and pest resistance. Herbicide Tolerant (GMHT) crops have genes inserted

that make the plant resistant to herbicides. Pest resistant GM crops are genetically manipulated to produce natural insecticides.

Loss of farm biodiversity

Wildlife on UK farmland is already in severe decline as a result of intensive farming. Arable plants have shown the greatest decline of any group of plants in the UK and many are now listed on the UK BAP[1]. Similarly more than 20 bird species including the tree sparrow, grey partridge and song thrush have undergone drastic declines since the 1970s[2]. Wildlife is under increasingly severe pressure from climate change. Adding a further potentially damaging factor to the natural environment is therefore likely to put our wildlife under greater stress at a time when mitigation and adaptation to that stress should be examined, as opposed to further adding to it.

Link is concerned that the introduction of GM technology could exacerbate these stresses on the natural world, resulting in exacerbating declines in farmland wildlife biodiversity. This is because the use of GM crops permits radical changes in agricultural practice that may lead to damaging impacts on wildlife. For example, GMHT crops allow farmers to apply broad spectrum herbicides to their fields, creating a monoculture devoid of the arable weeds which form an important food supply for many birds and invertebrates. Furthermore, the planting of GMHT crops may lead to increased chemical applications, since herbicides can be used on such crops earlier in the growth cycle of the plants. Studies in the US have also shown that farmers growing GM crops are using just as many toxic pesticides as conventional farmers and in some cases more so[3].

Evidence from Defra's Farm Scale Evaluations[4] indicates GMHT spring oilseed rape and GMHT beet resulted in significant environmental harm, whilst GMHT maize showed some positive benefits for wildlife when compared with the current (though soon to be banned) conventional production regime. We support Government's policy that commercial approval of crops should not be given where they are shown to result in environmental harm and hope to see this policy rigorously adhered to.

Where GM crops have been modified to allow them to grow under a much wider range of environmental conditions (e.g. through introduced tolerance to salinity, acidity, drought etc) farmers may be able to reclaim marginal land and grow new crops in environmentally sensitive areas. This could potentially lead to an even greater loss of semi-natural habitats and their resident species. It could also lead to a loss of important areas for recreational activities e.g. should arable crops be grown in the uplands.

GM tree crop technology is also developing and trials have taken place in the UK. Whilst the development of GM trees is not an objective of the Forestry Commission, globally there is considerable hope pinned on GM trees, including; increasing speed of carbon sequestration, "phyto-remediating" plots of land contaminated with mercury, reduced lignin for easier paper manufacture and insect resistance in forestry crops. The UN has also recently recognised the development of this technology, urging a

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[1] Preston, CD et al (2002) The Changing Flora of the UK. Oxford University Press.
[2] Campbell, LH et al. (1997) A review of the indirect effects of pesticides on birds. *JNCC Report No. 227.* Joint Nature Conservation Committee, Peterborough.
[3] Organic Consumers Association (2002) *Hazards of Genetically Engineered Foods and Crops.*
[4] Burke, M (2003) *GM Crops: Effects on Farmland Wildlife.* http://www.defra.gov.uk/environment/gm/fse/results/fse-summary.pdf

precautionary approach[5] towards the technology noting the "potential impacts of genetically modified trees on forest biological diversity"[6].

As with agricultural crops, some tree pollen is highly mobile, with pine pollen for example drifting up to 600km. The risks from GM trees may be even greater than from GM crops however, given the timescale of a GM tree in the environment and the isolated location of many commercial plantations, which would make monitoring and enforcement problematic. Whilst agricultural crops are harvested at or before the seed stage, trees are not, which means that the risk of regeneration of GM trees in the wider environment may be a significant factor.

Genetic pollution

We are further concerned about the transfer of genes from GM crops into non-GM crops, and from GM crops into related wild plants. Our concern has been heightened following the publication in July 2005 of a study commissioned by Defra[7], conducted by CEH Dorset, which demonstrated the genes conferring herbicide tolerance had transferred from GM oilseed rape to the related wild species *Sinapsis arvensis.* Unlike chemical pollution, genetic pollution cannot be recalled, cleaned up or constrained and is, in fact, self-perpetuating. A molecule of DDT released into the environment remains a single molecule or degrades over time, but a single GM allele can multiply itself repeatedly through reproduction.

GM transgenes have never been, and in many cases could never naturally be, part of the recipient species' gene pool. If transgenes find themselves in wild relatives of GMOs through hybridisation they may be subject to gene regulation different to that for which they were designed, with unpredictable results. For example, if a wild plant gains a competitive advantage through hybridisation with a GM crop it may become invasive (a "superweed"), displacing natural populations and reducing biodiversity.

Link believes that the transfer of genes from GM to non-GM crops would create problems within the food chain; producers will not be able to guarantee their produce as GM free, impeding their access to important markets as well as reducing the ability of the consumer to exercise their right to choose, unless adequate coexistence measures are implemented and enforced.

The risk of gene transfer is greater the longer the GMO remains in the environment. Longer-lived species such as trees are subject to a wider range of environmental stresses, and these stresses can in turn affect the behaviour of the modified genome. Even if there could be the prospect of sterile trees, this cannot be guaranteed. Whilst

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[5] The Precautionary approach or Precautionary Principle can be described as where there are threats of serious or irreversible environmental damage, lack of full scientific certainty shall not be used as a reason for postponing cost effective measures to prevent environmental degradation (as defined in the 1992 Rio Declaration on Environment and Development).

[6] Draft Decisions for the Eighth Meeting of the Conference of the Parties to the Convention on Biological Diversity. UNEP/CBD/COP/8/1/Add.21 March 2006, Curitiba, Brazil, 20-31 March 2006

[7] *The Potential for Dispersal of Herbicide Tolerance Genes from Genetically-Modified, Herbicide-Tolerant Oilseed Rape Crops to Wild Relatives*
http://www.defra.gov.uk/environment/gm/research/pdf/epg_1-5-151.pdf

agricultural crops are harvested at or before the seed stage, trees are not, which means the risk of regeneration of GM trees in the wider environment may be a significant factor.

Effects on non-target organisms

An issue that has received much media attention is the potential effect of GM crops on non-target species. Plants engineered to produce their own insecticides will affect pest and non-pest species alike, therefore reducing biodiversity and potentially threatening rare or endangered species. Such crops may also disrupt food chains. For example, work carried out in Scotland showed that individuals of 2-spot ladybird (*Adalia bipunctata*) were harmed when they ate peach-potato aphids that had been fed on potatoes genetically modified to produce the pesticide snowdrop lectin. Female ladybird life spans were halved and their reproduction reduced[8]. Defra's FSE trials only looked at GMHT crops, not insect resistance, and further research is needed on the effects of these crops on non-target organisms.

It is also important to consider the consequences of GM crops for the key insect species – namely the Hymenoptera (i.e. bees, wasps and ants) – upon which crop plants may rely for pollination. Research has indicated that some of the GM proposals run the risk of impacting on the viability of the critical ecosystem function that these insects perform, although impacts will depend on a case-by-case analysis of the gene concerned and its expression in the parts of the plant ingested[9].

Resistance in target organisms

Continual expression of insecticidal proteins by GM plants may lead to pest species developing resistance to the toxin. Such resistance will either eliminate the commercial benefits of the GM crop or lead to increased pesticide application and the use of harsher, more toxic chemicals.

Animal welfare issues

Significant investment has been made by biotechnology companies in research into genetic modification of animals. Growth hormones produced by GM microbes have been used to increase milk yields of cows, and transgenic cows, goats and sheep have been produced that express pharmaceutical proteins in their milk. This has significant implications for animal welfare. For example, the use of recombinant bovine somatotropin to increase milk yields of cows has been shown to cause stress on the immune system and an increased number of infections such as mastitis. The most extreme reported problem to date has been that of the "Beltsville pigs", in which the introduction of a gene for human growth hormone caused the pigs to develop severe arthritis, spinal deformities, and become blind or cross eyed and impotent. The suffering caused by such experiments does not appear to be justified, especially given that in many cases it is possible to produce the same proteins using modified micro-organisms.

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[8] Birch, A.N.E., Geoghegan, I.E., Majerus, M.E.N., McNicol, J.W., Gatehouse, A.M.R. & Gatehouse, J.A. (1999). Tri-trophic interactions involving pest aphids, predatory 2-spot ladybirds and transgenic potatoes expressing snowdrop lectin for aphid resistance. *Molecular Breeding* **5**: 75-83.

[9] Malone, L.A., Pham-Delegue, M (2001) Effects of transgene products on honey bees (*Apis mellifera*) and bumblebees (*Bombus* sp.) *Apidologie* **32:** 1-18