

Genetically manipulated food for thought

Europe is currently in the midst of a heated, often emotional debate about the risks and ethics of genetically manipulated (GM) food plants. The issues are diverse: possible environmental effects from the spread of transgenes, possible consequences of the spread of antibiotic resistance genes used as selectable markers in production of transgenic plants, effects of transgenes for pest and disease resistance on evolution of the target population; whether GM food should or even can be segregated from that produced by traditional plants; whether GM food should be labelled and what information the label should contain; whether there should be a moratorium on planting GM lines while further research is done.

Some of these issues are socio-economic; some are environmental. Others are clearly scientific, and many of these are firmly within the sphere of microbiology. For example, several of the tools that are used to create transgenic plants are derived from microbes, as are some transgenes used to confer pest and disease resistance. Might genes from GM crops end up in other microbes, with undesirable consequences? It is important therefore that microbiologists bring their specialist knowledge to bear in the debate.

There are two sides to the argument about GM plants: are there unacceptable risks, and is this technology actually necessary? The following articles by Sue Mayer and John Heritage focus largely on what they see as areas of risk and uncertainty; in each case there is a need for informed argument about the science, and a value judgement about the consequences. Are the processes giving rise to the perceived risk actually likely to happen? Are the outcomes to be feared, or do they pale into insignificance against the background of the weird and wonderful things already happening in the biosphere, and in particular, already achieved by microorganisms under their own steam? Are there beneficial consequences or objectives which outweigh the perceived threats?

In considering whether the technological advance of plant genetic engineering is actually necessary, it is important to look at a number of timescales. What is undoubtedly motivating the biotechnology companies at present is profit and the creation and expansion of market share. In the longer term, the most important factor is feeding the ever expanding human population. This has to be

done while causing the minimum of damage to the planet through over-intensification, bringing yet more natural ecosystems into cultivation, and over-exploitation of resources such as fisheries.

GM plants will undoubtedly offer greater productivity and improved mechanisms of pest and disease control. The latter are of especial interest to microbiologists. At present, food production is heavily dependent on the use of chemical pesticides: it is estimated that 1.5 billion people would starve if none were used. But these existing controls are fragile: pesticides are based on a very small number of groups of compounds, and are countered by development of resistance in the target species on all too many occasions. Can we afford to ignore the new opportunities offered by GM plants for expansion of the pest control armoury, often with environmentally beneficial side effects?

● If you have views on these issues, and those raised in the accompanying articles, why not write to the Editor of *Microbiology Today*.